ELECTRICAL REVIEW

[ILLUSTRATED.]

A WEEKLY JOURNAL OF

ELECTRIC LIGHT, TELEPHONE TELEGRAPH AND SCIENTIFIC PROGRESS.

(Formerly Review of Telegraph and Telephone.)

Vol. 6, No. 24. WEEKLY. | NEW YORK, SATURDAY, AUGUST 15, 1885. | $3 per annum. Single Copies, 10 Cents.

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Entered at Post Office, New York, as Mail Matter of the Second Class.

Bazin's Rotating Battery.

We illustrate the battery of M. Bazin, which is designed for the purpose of electric lighting. The zincs and the carbons are mounted upon one and the same axle, to which a slow and regular rotatory movement is communicated by the aid of a small electric motor supplied by a distinct element. The battery represented in Fig. 1 comprises eight elements, seven of which are utilized in the outer circuit; each element is composed of a disc of zinc placed between two discs of carbon; the liquid is contained in rectangular troughs, which hold each three liters. The immersion of the elements is regulated by raising up a platform on which all the troughs are placed. The immersion may vary from zero to one-third of the surface of the discs, according to the degree of exhaustion of the liquids. The diameter of the discs, and the number of the elements in series, may be made to vary according to the duration of the effects to be produced in the outer circuit. In all the movement is communicated at once to the carbons and the zincs.

The total quantity of electricity supplied, as well as the total electric energy, were obtained by measuring the corresponding surfaces of the subjoined diagram (Fig. 2) by means of Amsler's planimeter.

Each of the elements contained three liters of liquid. This liquid was an acidulated solution of bichromate of potash; 125 grammes bichromate, and 300 grammes sulphuric acid per liter.

The discharge was effected in three stages:

1. Continuous discharge for two hours (from 0 to 120 minutes). Stoppage of two hours twenty minutes.

2. Continuous discharge for one hour, with a greater immersion of the elements (from 120 to 180 minutes).

3. Total immersion of the elements and continuous discharge for 90 minutes, without stoppage between the second and the third stage.

The elbows of the curves at the points 120 and 180 minutes indicate distinctly the augmentations obtained in the yield by the decrease of the internal resistance resulting from the increase of surfaces.

The subjoined table summarises the principal conditions of the total discharge, the factors of which are shown at each instant by the diagram, Fig. 2:

Duration of discharge	4½ hours.
Quantity of electricity supplied	198,000 coulombs.
Quantity of electricity supplied	55 ampere hours.
Total available work	0.45 H. P. hour.
Total consumption of zinc (motor not included).....	1126 grms.
Mean consumption of zinc per element	160.9 "
Effective consumption per ampere hour.....	2.93 "
Theoretic consumption.....	1.213 "
Ratio of the two consumptions	2.4 "
Mean power of battery during a discharge.....	75 watts.
Mean power of an element...	10.74 "
Maximum power of an element.....	15 "
Initial electromotive power (7 elements in series).....	13.1 volts.
Final do. do.	11.9 "

If we calculate the consumption of the battery as referred to horse-power hours, and taking account of the circumstance that the seven elements during this discharge have yielded 0.45 horse-power hour, we find in round numbers:

Zinc.....	2¾ kilos.
Bichromate of potash	5½ "
Sulphuric acid...	.13 "
Total volume of solution.....	.45 liters.

Color Making and Fixing by Electricity.

J. J. Hummel, in a paper read before a recent meeting of the Society of Chemical Industry, presents an instructive view of the present condition of the production and fixing of coloring matters by means of electricity, an abstract of which will interest our readers:

In 1862, Dr. Letheby, of London, discovered, in two cases of poisoning by nitrobenzol, that this substance was changed in the animal organism into anilin, and this could be distilled from the contents of the intestines and from the tissue of the body. Letheby sought after the most delicate test for the presence of anilin, and found it in nascent oxygen, which caused mere traces of anilin to give a deep blue color. A single drop of a dilute anilin solution, say one gram anilin in a liter of dilute sulphuric acid—one of acid to seven of water—is placed upon a piece of platinum foil, forming the positive pole of a single Bunsen battery. If the liquid is then touched with the negative pole, a deep, blue-colored body is gradually deposited on the platinum. Half a milligram of anilin can by this means be readily detected.

By using a carbon pole which had been perfectly cleansed, Coquillon, with two Bunsen batteries, produced anilin black. He employed a concentrated solution of sulphate of anilin, and found, after the current had passed for twenty-four hours, the positive pole coated with a bluish-black or greenish-black mass, which could be readily detached. When dry it formed an amorphous black mass.

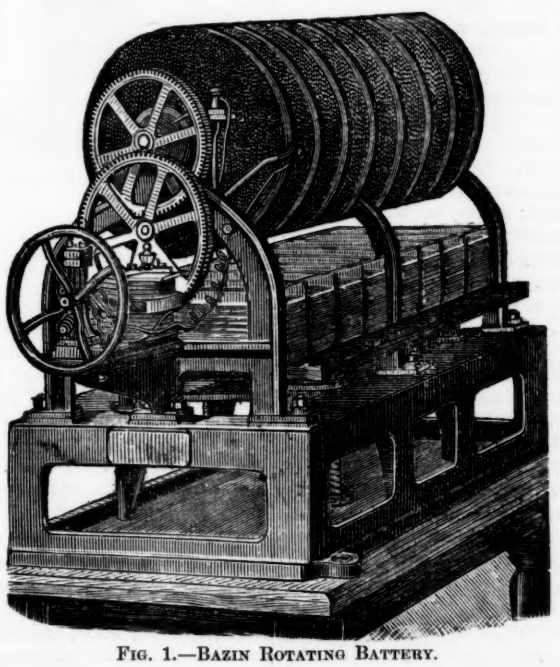


Fig. 1.—Bazin Rotating Battery.

Whatever be the solution used, the best yield of coloring matter is obtained when the liquid, surrounding the principal pole, is kept in constant motion.

In most cases, the production of coloring matter is to be ascribed mainly, if not entirely to the decomposition of the solvent itself, *i. e.*, water. Oxygen gas is given off at the positive pole, hydrogen at the negative. The oxygen, either in the nascent state or as hydrogen dioxide, acts upon the substance in solution and converts it into coloring matter, either by oxidizing it or by removing a portion of its hydrogen.

The researches of Prof. Goppelsroeder, as reported to the Industrial Society of Mulhouse, now constitute the most valuable series on the subject. His results may be briefly stated as follows:

1. Anilin hydrochloride in acid and in neutral solutions, give emeraldine and anilin black.

2. Anilin salt, with the addition of anilin and ammonia, gives only an insignificant deposit of a brown coloring matter soluble in alcohol, while the liquid acquires a deep red color and contains red and violet coloring matter. These can be obtained by evaporating the solution to dryness and extracting the residue with ether and alcohol.

3. Salts of para-toluidin yield, as the main product, a brown coloring matter, also a little red and yellow coloring matter. Salts of ortho-toluidin yield, on the contrary, a violet coloring matter, similar to that produced by bleaching powder; also small quantities of red, green, brown or yellow, emeraldine or anilin black.

4. A solution containing the proportion one molecule anilin hydrochloride and two molecules para-toluidin hydrochloride gives a red-colored solution at the positive pole.

5. Solutions of anilin and toluidin salts, in the presence of potassium nitrate, nitrite or chlorate, yield, at the positive pole, products from which rose-red and violet-red

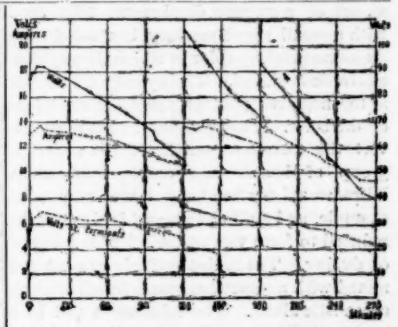


Fig. 2.—Diagram Illustrating Discharge of Bazin Battery.

products can be extracted, which, in their behavior toward mineral acids, resemble coloring matters of the saffranin group.

6. Salts of methylanilin yield, at the positive pole, a violet-red under certain conditions, also a blue coloring matter. Is this methyl violet?

7. Diphenylamine salts yield, at the positive pole a blue coloring matter soluble in alcohol. Is this identical with diphenylamine blue?

8. Salts of methyl-diphenylamine give blue and violet coloring matters.

Turning now to the results from the phenols:

9. An aqueous acidulated solution of phenol (carbolic acid) gives a brown coloring matter, and, under certain condition, also traces of yellow and orange red. An ammoniacal solution of phenol gives, under certain conditions, first a blue, afterwards brown and pink coloring matters, with traces of violet and yellow.

10. An acidulated solution of naphthol gives, as the principal product, a golden yellow coloring matter, possessing a green fluorescence; also a brown and a small quantity of red.

11. A solution of magenta containing methyl-alcohol, potassium iodide and a little sulphuric acid, gave, at the positive pole, Hoffman's violet.

12. When the electric current is passed through a solution of caustic potassa, containing finely powdered anthroquinone in suspension, a deep red color is produced, due to hydro-anthroquinone, but it is rapidly decolorized under the influence of the air. Only when the caustic potassa is extremely concentrated and the temperature very high, is there a product of alizarin. In this case, during the passage of the current, the melted mass becomes first red (oxyanthraquonate), then bluish-violet (alizarate), then reddish-violet (mixture of alizarate and purpurate), and then again red (purpurate). If the experiment is continued still longer, the mass becomes brown, then gradually lighter in color and finally white (potassic salts of organic and carbonic acids).

The alizarin is obtained by stopping the current whenever the deep bluish-violet is reached, allowing the mass to cool, extracting it with water and precipitating the alizarin from the solution by adding dilute acid. The yield of alizarin is always small.

That at the high temperature employed these transformations could take place without the aid of the electric current, appeared at first sight probable, but

experiment shows that such is not the case unless the heating is continued for a very long time, and even then only traces of alizarin are produced. Moreover, if, when the red color due to purpurate appears, the current is reversed, the mass becomes again violet, then red, and lastly grayish-yellow, since alizarate, oxy-anthraquinone, anthraquinone and even anthracene are probably reproduced.

The hydrogen of the negative pole can also be used. For example, there are several printing colors which, by reason of too rapid oxidation, present difficulties to the calico printer during the printing process, such as the anilin black printing mixture, reduced indigo, &c. The premature oxidation of such during printing may be prevented by putting into the color-box the negative electrode of a small battery or dynamo, and connecting the contents of the color-box by means of a porous diaphragm, tube, etc., with a small supplementary box filled with the same printing color in which the negative electrode is placed. The hydrogen given off at the negative pole prevents the oxidation of the color. This gas may be made to convert the nitro-compounds of the aromatic group of bodies into amido compounds. Nitro-benzol can be changed into anilin, for example, and anilin black and indigo can be reduced to form vats suitable for the purpose of dyeing. The indigo is finely ground and mixed with a somewhat concentrated solution of caustic alkali. The mixture is put in a porous earthenware cylinder resting in a proper vessel also filled with the same alkaline solution. The copper vessel is connected with the negative pole of a galvanic battery, while a strip of platinum attached to the positive pole is inserted in the contents of the porous jar. It is well to heat the contents of the porous jar. It is well to heat the contents of the copper vessel to the boiling point to accelerate the reduction.

Although hydrogen gas is given off in large quantities at the negative pole, in the cold the reduction is very incomplete; but when the alkaline mixture is heated, the evolution of hydrogen ceases, since it then reacts upon the indigo-blue and changes it into indigo-white, which dissolves in the caustic alkali. The characteristic odor of the ordinary indigo vat is soon perceptible, the solution in the copper vessel acquires a greenish-yellow color, becomes covered with the usual indigo "flurry" or scum, and may serve for dyeing according to the ordinary method.

It is even possible to reduce the indigo upon the fiber itself, so that at the moment of reduction the fiber shall be at once impregnated with a solution of indigo-white, and it requires then only to be exposed to the air to become permanently dyed. To this end the fabric to be dyed is impregnated with a solution of caustic alkali mixed with finely ground indigo and placed between two metallic plates, one of which forms the positive, the other the negative pole. After passing the current through for a short time and exposing the fabric to the air it is dyed blue. With a current of suitable intensity it might even be possible to dye calico pieces continuously by passing them, after impregnating them with the mixture of alkali and indigo, through a pair of metal rollers which form the positive and negative poles of an electric battery. The cloth would of course require to be exposed afterward to the air and washed.

The possible uses of electricity in the production and fixing of coloring matters may be assumed to be:

1. The production of coloring matters and their intermediate products.
2. The bleaching of textile fabrics.
3. The dyeing and printing of textile fabrics.
4. The discharging of dyed colors.

*** The Peruvian telegraphs are working as far as Chancay, north of Lima, and are expected to be open at Huarmez this week. A telephone concession for the city of Callao has been granted. Five per cent. of the proceeds are to be paid to the municipality.

A Rival of the Famous Calumet and Hecla.

The great strike of the Calumet and Hecla copper-bearing bed in the Tamarack shaft is fully as good as we stated last week in our copper report. The ore will average 4 to 4½ per cent. as in the Calumet workings, which are 300 to 400 feet distant from the new shaft. Its effect is already apparent in the value of the Tamarack Company's stock, which now stands at $60, on $13 paid up. The company had a capital of $1,000,000, in shares of $25 each. The property of the company consists of 1,280 acres of land, presumably all underlain by the copper bearing bed, of which the first important one is the Calumet bed, 9 feet in thickness. This is found at a depth of 2,270 feet, and it is proposed to continue the shaft 600 feet further to cut the Osceola amygdaloid bed, cutting some other workable beds between these. About 80 acres of the bed can be worked without a slope from the new shaft; but another shaft, probably at least 5,000 feet in depth, will probably be sunk to the dip. In this district, no material increase in temperature has been found with depth. Such a shaft can probably be sunk now at the rate of nearly 100 feet a month. Levels can be driven at 100 feet a month. The present shaft, 2,270 feet deep, 20 feet by 8 feet in section, is provided with two hoistways and a pump ladder compartment, and with engines said to be capable of hoisting four-ton cars at a speed approaching 1,800 feet a minute. The cost of the shaft-sinking has been about $140,000, or less than $62 a foot, and that of the machinery about $50,000. This property will before long have to be counted in as an important factor in the copper market. That it will ever equal in output the famous Calumet and Hecla is improbable, but by no means impossible. The mere shadow of this possibility of a new spring of seven or eight per cent. of copper is enough to cause a flutter among the producers who are struggling to exist at ten cents.—*Engineering and Mining Journal.*

A Whale Entangled in a Telegraph Cable.

In August of last year some articles under the above heading appeared in the daily papers, referring to a very interesting account of the breaking of a submarine telegraph cable by a whale. The account in question was somewhat meagre in detail, and not altogether correct; and my excuse for resuscitating the matter is that I have lately received a history of the circumstances from an eye-witness, and perhaps the story is of sufficient interest to merit a place in your columns. It struck me at the time that the subject was far too summarily abandoned, and that those who had full information at their command should have given more details. For instance, one would like to know the depth of water at the place where the whale was discovered attached to the cable, and whether any fault existed beyond the damage actually done to the cable, by the whale in its efforts to escape, or if there was any break, due perhaps to some submarine landslip. And I may here mention that the cables laid along the coasts of Peru and Chili (the one now under discussion forming part of this system) have more than once been broken by these submarine landslips, which, I believe, have generally been found to correspond with some severe earthquake felt on the coast.

It was stated in the account referred to that the interruption of telegraphic communication was owing to damage caused by the whale. Now, if this were the case, one must believe that the animal, while groping about the bottom, had come across the cable, and had there gathered up sufficient slack so as to wrap several turns of the cable round it. It is difficult to understand how this feat could have been accomplished. Nor is this all; for, as more than a week had elapsed between the date of the interruption and the moment when the whale was discovered attached to the cable, we must also believe that during this time the animal had submitted to captivity, retaining for so long a period life and strength. In order to live, a whale must come up to blow; and if the one in question had done this, entangled as we are told, in the cable, it would have been obliged on each occasion to lift an enormous weight from the bottom, besides sustaining repeated injuries due to the strain of the turns of cable round it.

From my correspondent's letter it appears that the cable was grappled for and hooked (how far from the point of interruption is not stated), and some considerable quantity picked up, when an abnormally heavy strain was noticed. The picking up was continued very slowly and cautiously as it was supposed that the cable was to some extent buried. It soon, however, became evident, that the cause of the great strain was a huge mass, apparently attached to and coming up with the cable, and the astonishment of all on board may be guessed when it was seen that a whale some seventy-five to eighty feet long was entangled in several turns of the cable. On reaching the surface the animal commenced a series of plunges, which quickly resulted in the breaking of the cable close to the bows; and at the same moment the turns round the whale cut deeply into his body. After a few weak struggles and some spouting of blood and water, the whale lay motionless, the turns of the cable still remaining round it.

Fan Motor of Chas. J. Klein & Co.

The ship, released from the cable, naturally drifted to leeward, and the stench emanating from the carcass is described as having been something awful. The cable appears to have been again grappled for, and picked up some little distance off, and the short piece attached to the whale at one end was buoyed at its other extremity. The repairing operations were continued, the whale meantime being sighted several times, and myriads of birds had collected around it.

The repairs being completed, the ship could not recover the short piece of cable attached to the whale, owing to the bad weather having suddenly set in, and it was necessary to lie-to during the afternoon and night. The next morning it was found that the whale had disappeared, and on recovering the piece of cable only a few pieces of blubber were discovered still remaining on the turns which had encircled the whale. The cable in the immediate neighborhood of the part which had imprisoned the animal was found to be much crushed. in many places the sheathing wires being forced open, the core destroyed, and the copper conductor broken, as if the whale in its endeavor to escape had tried to bite through the iron wires.

It seems a difficult matter to attempt a solution of how the whale became entangled. In the case of the Persian gulf cable to which a whale was found attached, I have heard it suggested that the animal, finding a portion of the cable suspended across some depression in the bottom, had tried to rub off, against the cable, lice which so much trouble these creatures, and in doing so had wrapped several turns round its body. I think, from the circumstances, that in the case now under notice such could not be the motive for the whale's interference with the cable. Perhaps some of your readers may be able to throw light on the subject.—*Cor. London Field.*

Fan Motor.

The cut on this page illustrates the new Fan Motor of Chas. J. Klein & Co., of this city. It is wound normally for a 20-volt current, but can easily be made so that it can be connected with any electric light current and work safely and satisfactorily. Messrs. Klein & Co. have placed a number of these fans in various parts of the city, and their customers are well pleased. At the National Theatre fifteen of them are in use, and the cooling effect is very noticeable.

Mr Klein, of this company, has, after extensive experiments, found a solution for porous cup of the Bunsen cell, so that an incandescent lamp can be kept burning ten hours without perceptible loss of lighting power. The cell gives a 2-volt current, and has a low internal resistance. The cost of the solution per cell of one pint of two volts, for ten hours' service, is about three cents.

Telephone Stocks in Mexico.

Mexican telephone stocks are now so far reduced in the public appreciation that they have lost all appearance of being serious investments for capital. This is not the fault of the active managers of the telephone in Mexico. The root of the trouble lies in the expensive management of these companies, of which eight are, at the present moment, operating in this country, all of them, we believe, duly provided with boards of directors, presidents, secretaries and treasurers, and all paying office rents in American cities. If there could be a consolidation of the companies effected, and the management concentrated in one general manager here in this metropolis, many important economies could be carried into effect. The several Mexican telephone companies are too heavy at the top. A mere enumeration of them is of interest, as showing to what a ridiculous extent this telephone apportionment of territory has gone in this country. First we have the Mexican Peninsula Company, controlling the States of Oajaca and Yucatan; next comes the Mexican Central Telephone Company, which controls the States of San Luis Potosi, Zacatecas, Aguascalientes, Queretaro and Guanajuato; also the Mexican Northern Telephone Company, which has the States of Nuevo Leon and Tamaulipas, with a general manager residing in the distant American State of New Jersey; then comes the Chihuahua & Durango Company operating in those States; next we have the Puebla Telephone Company, which operates in the States of Puebla, Tlascala and Hidalgo; then there is the Mexican Pacific Telephone Company, controlling the States of Sonora, Sinaloa and Colima; also the Vera Cruz Telephone Company, operating solely in the State of Vera Cruz, and lastly the Mexican Telephone Company, with headquarters in this city, and controlling the business of the city, State and federal district of Mexico, besides the State of Jalisco, the telephonic center of which is Guadalajara. This is truly a formidable list for this country. The stockholders of these eight companies might have a better chance of securing a dividend, if a consolidation could be brought about.—*The Mexican Financier.*

*** The elevator in one of the electric light towers at Detroit broke its fastening and went up to the top in a very great hurry, striking so forcibly as to shatter the top of the tower. One of the lamps fell to the pavement within a few feet of a pedestrian, and a piece of iron weighing a pound or more bounded through one of the Post Office windows, knocking off the hat of a man who stood near by examining his mail. It was necessary to remove all the lamps, most of the fastenings being broken, but they were temporarily replaced during the day.

Aluminum Prophesied as the Successor of Iron and Steel.

"The metal of the future," said a prominent mechanical engineer, "is aluminum. In a few years it will displace iron and steel, and simply revolutionize industrial arts everywhere. The millennium will be the age of aluminum."

"But," said the reporter, "iron is the commonest of all metals, and aluminum is comparatively rare. Is there enough aluminum in the world to take the place of iron?"

"Yes," said he, "and your former assumption is an error. Aluminum is the most plentiful of all metals. The world contains ten times as much of it as of iron. It is everywhere. Every clay-bed is an aluminum mine."

"What is the reason," was asked, "that it has not already come into general use?"

"The great cost of producing it," he replied. "The metal called sodium is used in the production of aluminum, and it is very expensive. Numberless methods have been tried, and hundreds of chemists all over the world are devoting their lives to the task of finding a cheap way of producing aluminum. The man who succeeds will be more fortunate than though he had found the philosopher's stone. Whoever can produce aluminum at $1 a pound will make a fortune, while a man who can make it for 25 cents a pound can buy out the Rothschilds in a day."

"What is the cost of aluminum now?"

"The raw materials for making it are not worth $20 a ton. That is, $20 for enough to produce a ton of metal. But a ton of aluminum, perfectly manufactured, is worth at least $20,000."

"What are the valuable properties of aluminum, and to what use can it be applied?"

"It can take the place of almost every other metal in the world," said he, "and very largely that of wood, also. In the first place it is very strong. Its tensile strength is more than three tons to the square inch greater than that of the best Bessemer steel. In fact, it is by far the strongest metal known. A cannon made of it would be three times as strong as one made of steel or gun-metal. It is very stiff or rigid, too; three times as rigid as the best of bronze. Another important thing is that it will not tarnish. Neither air, nor water, nor salts, nor acids, nor corrosive gases, have the slightest effect upon it. Neither does intense heat change its color. It is the best conductor of heat known in the world; also of electricity. It would make the best telegraph wires in the world, having twice the conducting power of copper, with only a third of its weight, and lasting practically forever. It is very ductile, and can be drawn into wire more easily than almost any other metal. Moreover, it is easily worked, either cold or hot. It is suitable for anything that iron or steel or copper or brass or bronze or gold or silver is used for, from the wheels of a watch to a monster steam engine."

"How does it compare in weight with other metals?"

"It is by far the lightest; lighter, indeed, than many hard woods. It is little more than one-third the weight of cast iron. To be exact, a cubic foot of aluminum weighs only 166 pounds. The same sized block of cast-iron weighs about 451 pounds; of wrought iron, 487 pounds; of copper, 554½ pounds; of lead, 709 pounds; of brass, 528 pounds; and of gold about 1,200 pounds. In brief, it is the lightest, easiest worked, strongest, most durable, and generally most valuable of all metals, and the man who invents and patents a method of making it cheaply will revolutionize industry, and become the richest man in the world."

—— The four electric light towers at the intersection of Washington, Pennsylvania, Illinois and Ohio streets, were lighted up for the first time last night, and the illumination was brilliant and far-reaching. Above the burners are patent reflectors, which perform an excellent service, and for street-lighting purposes these towers are superior to that in the Circle, as they are much lower. They occasioned much favorable comment last night.—*Indianapolis News.*

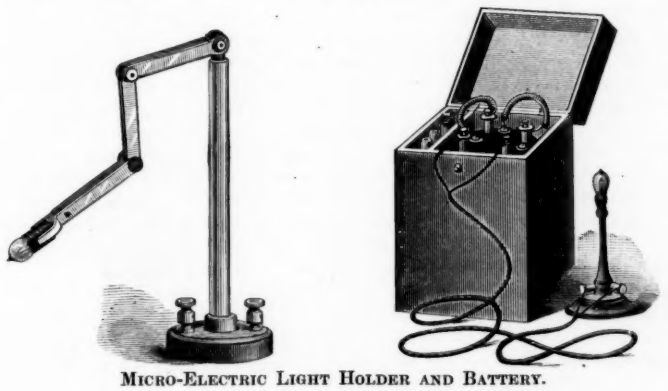
The Inventor of the Valve Motion.

The invention of the valve motion to a steam engine was made by a mere boy. Newcomen's engine was in a very incomplete condition, from the fact there was no way to open and close the valves except by means of levers operated by hand. He set up a large engine at one of the mines, and a boy (Humphrey Potter) was hired to work these valve levers. Although this is not hard work, yet it required his constant attention. As he was working the levers he saw that parts of the engine moved in the right direction and at the same time he had to open and close the valves.

He procured a strong cord, and made one end fast to the proper part of the engine, and the other end to the valve lever, and the boy had the satisfaction of seeing the engine move with perfect regularity of motion. A short time after the foreman came around, and saw the boy playing marbles at the door. Looking at the engine, he saw the ingenuity of the boy, and also the advantage of his invention. The idea suggested by the boy's inventive genius was put in a practical form and made the steam engine an automatically working machine.

The Adjustable Micro-Electric Light Holder and Battery.

This is an instrument of superior electrical excellence, and is designed for the use of microscopists and others desirous of focusing light on slides or objects on which it would be impossible to obtain sufficient light from gas or a kerosene lamp. The light may be placed in any position, or moved at will either above or below the stage, as the operator elects.



MICRO-ELECTRIC LIGHT HOLDER AND BATTERY.

The Adjustable Micro-Electric Light Holder is made of polished brass, highly finished, and is insulated by hard rubber and ivory. It consists of an upright, six inches high, fastened on a stand. From the top of the upright there project three jointed arms 6½ inches long, at the end of which may be placed lamps of any desired candle-power. The upright and arms act as conductors of the current to the lamp, consequently there are no wires to annoy the operator while using the instrument. It may be used with any lighting battery, but is generally used with the style of battery illustrated on this page. The new 3-cell battery jar, illustrated in a recent issue of the REVIEW, and on which the enterprising inventors and manufacturers, Messrs. Stout, Meadowcroft & Co., expended much time and money in bringing to its present perfect state, is particularly adapted for this work. This battery jar, owing to its compactness and convenience, is destined to meet with popular favor, and will no doubt secure a position among the standard elements of the trade. This firm also manufacture the Micro-Electric Light Holder, which we illustrate this issue.

—— The Stillman Hotel, Cleveland, is to be lighted with 1,000 sixteen candle-power lights of the United States system.

—— The Public Library building, at St. Louis, is being wired by the United States Electric Light Company for 300 incandescent lights. The lamps will be in working order September 1st. Prospects for future electric light work are bright in St. Louis. The city is finally realizing the value of the electric light.

Electrifying a Sick Hyena's Nerves.

"Hyena" is the conspicuous sign on one of the menagerie cages of the South Side Dime Museum, Chicago, Ill., but the cage is empty. Three weeks ago the eyes of the spotted occupant began to roll deliriously, and, scorning the dago pies and other delicacies that were introduced into the cage as remedies, he laid down in the sawdust to die. After he had remained in a palsied condition for two weeks and more, a scientific man happened along in the freak-seeing crowd. "Why don't you give him a shock of that electric business down stairs," he suggested to the keeper. The keeper told the piano-player, and the piano-player told the glass-blower, and the glass-blower told the press agent. "Just the thing," exclaimed the latter, but the manager said: "No; let him alone; he is only afraid the cholera is coming. He'll be up in a day or two."

Unfortunately, the manager's word did not go farther than the box office. The other day, while there was a lull in the life of the place, the keeper and a couple of confederates sneaked up-stairs with the galvanic battery, which electrifies your nerves at 5 cents a shock, and is advertised to tell your fortune in the bargain. The cage door was opened just enough to permit the placement of the battery. The almost insensible hyena was dragged up to the bars by the nape of the neck. One handle was tied in his paw. The other was stuck between his teeth. The current was thrown open, and the switch-bar run up to 900 at one dash.

A shriek that would have resurrected a necropolis, a single bound to the top of the cage, and the hyena fell dead on the battery. The monkeys chattered, the jack-daw laughed hysterically, and the museum attaches all scampered down to the ground floor. A delegation of pale-faced men waited on the manager and imparted the news. "I knew it," he replied, philosophically, "$100 for an electrical experiment that Ben Franklin would have made on a dying cat." The corpse of the hyena was buried in the alleyway at midnight.

—— The lighting of the Sailors' Snug Harbor buildings, Staten Island, by electricity is under advisement.

—— We gave a complete description of the electric lighting at Westwood House, Sydenham, and recently Mr. and Mrs. Henry Littleton invited a large number of guests to witness some private theatricals, the theater being lighted throughout, under the direction of Mr. Augustus Littleton, with incandescent electric lamps. The raising and lowering of the luminosity of the lamps was absolutely perfect, and was effected by the approach or retrogression of zinc plates traveling in a trough filled with a solution of sulphate of zinc. The apparatus for this purpose, and the switches for the various circuits, have been designed and constructed in Mr. Littleton's workshop in a manner which would reflect no discredit upon any manufacturer of electrical plant, and the wiring of the theater throughout has been accomplished by Mr. Littleton personally. This installation at Sydenham is probably as good an example of domestic electric lighting as any now in operation, and the accumulators used in connection therewith have already exceeded the limit of life given by Mr. F. Geere Howard, without showing any signs of deterioration.

* * Some poet should weave into the obituary poetry of the hour the remarkable fact that the same day that lightning struck Mt. McGregor it struck the mound where the tomb now stands; in fact, opening the ground for the work.

* * At Bethel, Belmont County, Ohio, a few miles from Wheeling, W. Va., a vein of natural gas was struck at 1,200 feet, which is phenomenal in its pressure. The gas, when struck, threw mud, stones and debris one hundred feet in the air, and the well is now burning with a flame sixty feet high. The roaring can be heard for three or four miles. Hundreds of people have visited the place from all the surrounding country. The pressure is estimated at forty pounds per square inch.

* * Gold may be said to be everlasting, indestructible. The pure acids have no effect upon it. Air and water are alike prohibited from working its destruction; while to baser metals they are decay, to gold they are innocuous. Bury it through long ages, and when the rude tool of the excavator again brings it to light, while everything around it and originally associated with it has returned to dust from when it sprang; while the delicate form which it adorned has become a powder so impalpable as to be inappreciable; while the strong bone of the mighty warrior crumbles as you gaze upon it; while his trusty sword lies a mass of shale rust, the delicate tracery in gold which adorned it, or the finely wrought tiara which encircled the lofty brow of the fair damsel is there in its pristine beauty, perfect as when it left the workman's hands, and became the joy of her fleeting moments. Yes, days, years, centuries upon centuries have rolled by, mighty empires have risen and fallen, dynasties that dreamed their power to be everlasting have passed away; armies have marched, conquered and become nerveless with decrepit old age; cities teeming with population and commerce have become the dwelling-place of the owl and the bat; the very pyramids themselves, raised in the pride of power, and destined to be forever, have crumbled and are crumbling; and yet that thin filament of gold has stood unchanged through all these mighty changes; it has withstood triumphantly the destroying hand of time; it is to-day what it was three thousand years ago. Surely it is a noble metal worthy of all admiration.

* * An invention which it is anticipated will be of importance in future warfare was exhibited recently in the grounds of the Albert Palace by Mr. Eric S. Bruce, the inventor. It consists of the application of electric lighting to balloons, by means of which signals may be flashed at night over very wide areas. Before giving a practical demonstration of the working of his invention, Mr. Bruce delivered a brief lecture in the concert hall of the Albert Palace, in which he stated the results of his experiments and explained the manner in which he had arrived at them. The invention consists of an ordinary balloon made of a material as translucent as possible (in the case of the one at present on exhibition the material is cambric) in which are fixed a number of incandescent lamps. The balloon is a captive one, and the rope which secures it is also utilized for conveying the electric current to the lamps inside the balloon. The Morse system of telegraphy is employed for the signaling, which illuminates the balloon with flashes of light of longer or shorter duration. The invention dates back only two months, and the experiments were made with a large balloon for the first time, and were completely successful. It is proposed to continue the exhibitions of signaling for a month. The chief obstacle to be overcome in introducing the electric light into the balloon was that occasioned by the highly inflammable nature of the gas with which the balloon is inflated. This has, however, been successfully surmounted. During the evening several sentences, including "God save the Queen," "Rule Britannia," and "Health and happiness to Princess Beatrice," were flashed from the balloon.

Electrical Review.

Published at 23 Park Row.

P. O. BOX 3329.

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SUBSCRIPTION.

United States and Canada, $3.00 per annum, in advance. Postage paid by publisher.

Great Britain and other foreign countries, $4.00, in advance. Postage paid by publisher.

ADVERTISING.

Transient, 25 cents per line, nonpareil.

EDITORIAL ANNOUNCEMENT.

Address all communications and make all checks and P. O. orders payable to order of ELECTRICAL REVIEW P. O. Box 3329, New York

We invite correspondence from Electricians, Inventors and the Telegraph and Telephone fraternity and those engaged in Electric Lighting on matters pertaining to electrical and scientific subjects, and all facts of special interest in connection therewith.

We extend to manufacturers of electrical apparatus an invitation to send to this office any and all facts concerning their business which will be of interest to the public. We make no charge for publishing news.

Subscribers can at any time have the mailing address of their paper changed by sending both old and new address.

Mr. J. Viennot, 150 South Fourth Street, Philadelphia, is our accredited representative for Pennsylvania.

Mr. C. C. Haskins, 118 LaSalle Street, Chicago, Ill. will represent the REVIEW in the West.

Messrs. Wm. Dawson & Sons, 121 Cannon Street. London, England, are our representatives for Great Britain.

NEW YORK, AUGUST 15, 1885.

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There is one telephone company that doesn't fail to pay dividends. July 31st the Nebraska Telephone Company paid its regular quarterly dividend of 2 per cent. and also declared an extra dividend from the surplus fund of $4.80 per share. These little favors coming as they do are very gratifying to stockholders, and are strong proofs of the excellent methods of those wide-awake officials, Vice-President Dickey and General Manager Drake.

The representatives of the Bankers and Merchants' and United Lines Telegraph Companies have elected the following named gentlemen as officers of the latter company: President and Treasurer, E. S. Stokes; Vice-President, John Anderson; Secretary, Dwight Townsend. Mr. Stokes' election as President is attributed to his close relation to Mr. Mackay, to whom the Postal Company is over $100,000 in debt. It is supposed that the new organization will lead to a union between the Bankers and Merchants', the Postal and the Southern companies.

The fourth reunion of the United States Military Telegraphers will be held in this city, August 19th and 20th. The occasion promises to be a memorable one, and we hope to see it largely attended.

As this is the last issue of the REVIEW before the meeting of the National Electric Light Association, we would respectfully urge upon all electric light companies who may see this in time, to be represented on this occasion. The meeting will be an important one.

Mr. C. Langdon-Davies, London, is the inventor of an electrical instrument named the Phonopore (*phone*, sound; *poros*, a passage), because it claims to afford a free passage of electrical effects associated with sound, such as telephonic messages and harmonic telegraphs, without permitting the passage of electric currents, such as ordinary telegraph currents. The instrument is not a conductor of electricity, and cannot, therefore, form part of a conducting circuit, as ordinarily understood. The phonopore is neither a telephone nor telegraph instrument, but a "means by which these can be worked together on the same wires, utilizing the telegraph wires without interfering with the work they are now doing." The possibilities of this invention are such as to attract considerable attention to it.

The *Herald* of this city, asks, with an air of authority, why the underground wire commissioners have permitted the wires to remain above ground so long. Perhaps these gentlemen realize the electrical and commercial problems to be dealt with in this work—a little matter that doesn't trouble the *Herald*—and are proceeding carefully and intelligently. To accomplish the work of burying all the various electric wires of this city so that their efficiency will remain undisturbed, and so that their life can be counted on as before, is a task of no small proportions, and we trust the honorable commissioners are considering the matter from a sensible and practical standpoint. No business man wants the wires put under ground if by it he loses his telephone or convenient telegraph office. No electrical company can afford to bury all its wires in the present stage of information on the subject, and those that are experimenting in this direction are continually encountering and overcoming obstacles that the talented writers of the daily press know very little about, and evidently do not care to be informed on, for that would destroy their thunder. The commissioners are acting wisely in hearing the views of the practical men in the field, and out of this will come some light on the vexed question of burying the wires.

At the meeting of the Electrical Subway Commissioners this week a communication was read from President Norvin Green of the Western Union Telegraph Company saying that the company does not contemplate placing any more wires overground at present, except an occasional start wire to reach new subscribers of the Gold and Stock Company. The company, he said, had already put many wires under ground. All the wires connecting with cables across the North River at Cortlandt and Liberty streets, and down-town wires from the main office to the Stock, Produce, and Cotton Exchanges, were under ground. The company, as stated in the REVIEW, has tubes running to the Twenty-third street office, through which a large number of wires could be drawn. The company proposes to continue this work until all the trunk lines are carried out of the city with insulated wires under ground. James A. Palmer, general manager of the Brooks Underground Conduit Company of Philadelphia, sent a letter to the Board advising the laying of parallel pipes in the streets east and west of Broadway, and placing wires in them. Theodore N. Vail, President of the Metropolitan Telegraph and Telephone Company, submitted a communication with maps and plans for the placing of wires under ground. The Commissioners will discuss these and other plans they have received at some future time.

A MODIFICATION OF THE BUNSEN PHOTOMETER.

All who have occasion to use the Rudorf modification of the Bunsen Photometer, in which the screen bisects the angle between two mirrors set with an angle of 140° between them for accurate measurement, have no doubt met with the common difficulty of placing the screen exactly within certain limits.

That is, after it has been set, it is possible to change its position considerably without altering to an appreciable extent the appearance of the spot. And again, where using, for instance, the constant-level Argand lamp to measure the intensity of the light of an arc lamp employing a screen with the ordinary grease-spot, the difference in color of the two lights proves a source of annoyance and error.

These defects are happily remedied in a modification of the Rudorf screen by that accomplished young officer, Lieut. Millis, of the U. S. Corps of Engineers, and its perfect applicability is only equaled by its simplicity.

The ordinary Bunsen screen, as is well known, consists of a ground of white paper doubled, in which, at the center of the screen is cut a circular hole which is closed by a single thickness of paraffined paper pressed between two layers of white paper. The modification consists simply in placing from one to four thicknesses of paraffined paper, according to the strength of the light to be tested, between the white sheets, and where these sheets appear at the opening the paraffined paper has a circular hole cut in it concentric with that of the white paper, its diameter being about one-third that of the latter. By this change the effect of color seems to be eliminated, and in the reflected images, when the screen is at its proper position, we have an intense black center in relief against a white ground. A slight movement of the screen along the bar alters this effect, and thus the utmost nicety of adjustment is rendered possible.

TELEPHONE AND ELECTRIC LIGHT IN FRANCE AND BELGIUM.

Singularly enough, Paris with its splendid system of underground conduits, has a very incomplete telephone service. In what is called the *banlieue* or outlying districts, there is little or no telephonic communication. Many attempts, however, have been made to have a complete telephone service. In its meeting of July 1st, the Council-General of the Seine was called upon to act upon a petition addressed by the *Conseil Municipal de la Commune du Pre-Saint-Gerrais*, asking that all the communes of the *banlieue* should be joined by telephone at the Prefectures of the Seine and Police. After the report of the Commission appointed to inquire into the matter, it was discovered that such a measure would require a considerable outlay of money, and leave little work for the telegraph already in use. For this reason the petition was rejected by the Conseil-General.

In Belgium, telephonic service was offered to the general public on June 29th, over the lines of Louvain and those of Brussels and Anvers. On July 15 the lines between Mons and Brussels were thrown open.

The electric light installation, by means of accumulators in the *Passage des Panoramas* in Paris, has been successfully kept up by the Agence Generale d'Electricitè, says the *Bulletin International*. By reason of the satisfaction given to the consumers, most of them have continued their adhesion to the project, notably the Brewery of the "Golden Rooster," situated on the street Montmartre, at 250 meters from the machines, the number of lamps in actual service here being eighty-seven. The installation has remained in the best condition since January 3d, and the twenty-one accumulators which compose the battery have not yet required any repairs. The light is very regular and, owing to the elements used in the secondary batteries, is very constant. This has so impressed the *Syndicate du Passage des Panoramas*, that they have decided to adopt it permanently.

THE COMING EXPERIMENT AT CREIL AND ITS CHANCES OF SUCCESS.

It is with deep regret that we find that M. Marcel Deprez is not likely to realize the bright hopes he once entertained, as to the transmission of electrical energy. No journal, either in America or England, was so well disposed toward him as the ELECTRICAL REVIEW, of New York. Knowing that no great object can be accomplished without numerous *faux pas*, we did not look upon his scheme as a failure, because he did not at once do all that he promised himself. We heeded not the doubts of the skeptic nor the jeers of the dilettante, for have not all the great projects of the century been scoffed at by the superficial and the ignorant? Surely if the inclination of the skeptic be once indulged, then every man will laugh at what he does not understand, and every attempt to increase our knowledge, or move forward in the path of progress, will be hailed with jeers and dirision. But now, it must be admitted, Deprez has arrived at a point which successive experiments have shown his incapacity to pass, and a close and careful examination demonstrates that he never will be able to accomplish his purpose, at least in the manner he has suggested. The Foucault currents have run his frail bark upon the sands of the impracticable, if not the impossible, and it remains for him to discover another means of accomplishing his purpose, or admitting that it is defeated. Yet he has made a good fight and shown more than ordinary sagacity in surmounting difficulties and bearing up under defeats that would have staggered smaller men.

Though we do not believe he is likely to succeed in his coming experiments at Creil, yet we cannot help admiring his pluck and determination, and wishing him the best success. The new dynamo machines he proposes to use in these experiments, have been made by MM. Mignon & Ronart, and the bobbins by the Company Breguet.

Our French contemporary, *Bulletin International*, always well-informed as to what is going on in electrical science in France, says: "M. Marcel Deprez has had too many flatterers in his former attempts, and has been inclined to set a value upon the results he attained, far in advance of their real value. For nothing that he has yet done by means of the Gramme machine has proved his ability to transmit large quantities of electric energy to a distance with economy. After his recent failure at Creil, he could scarcely return there to repeat the same experiments with the same apparatus, and hence he has somewhat modified this. But will he be more successful in his new attempts? We sincerely hope he will, but candor compels us to confess that there is no reason to believe that these coming trials have any other significance or any other aim than to pave the way for a graceful defeat. For the rest we begin to learn how much importance to attach to these promises of a complete revolution in industrial processes, by means of the transmission of electrical energy. The example furnished by the hydraulic system at Bellgarde, suffices to put us on guard against these dangerous illusions. For the last thirteen years there has been at that place an hydraulic force equal to ten thousand H.P., which awaits utilization by these electrical amateurs. At this moment there is utilized a total force of 1,900 H.P., of which there is need of only 800 H.P."

And so all our dreams of transmitting electrical energy in large quantities to a distance are crushed, nipped in the bud, when it looked as though they were just on the point of being infused with life. It is, however, our firm belief that this is but a temporary check, that the project of the transmission of electrical force will yet be taken up and carried to a successful issue, though probably by other hands than those of the indomitable but over-sanguine M. Deprez. At small distances it is now a *fait accompli*, and the signs of final success are so clear that such men as Sir William Thomson have prophesied the final and successful solution of the problem.

GENERAL WESTERN NEWS.

A curious electrical conundrum comes from Des Moines, Iowa. In the capitol building there is an electrical time system on a metallic circuit, by which several clocks are kept in movement by battery power. Recently, during a severe storm, the clocks all stopped and remained quiet until the electrical storm ceased, when they commenced their proper labors again and regularly performed their duties as before. There are two or three possible explanations of this phenomenon. With a partial ground connection at one point an induction leak might flow through the magnet and hold this permanently closed or open, according to the direction of this flow. If this escape were such as to provoke a stream of sparks such as all old operators have seen flowing through an open key during a thunderstorm, the clocks might have been short-circuited, the battery reversed or even polarized, and afterwards assume its natural functions by depolarization.

In the early days of telegraphy, on the line from Buffalo to Toronto, Canada, during a heavy storm, the battery-room in the Buffalo office was so completely filled by induction that every nail head in the woodwork became luminous when we approached them, and some of the most daring of the boys had the hardihood to point their fingers at these, when brush lightning, similar to that which escapes from a static machine, visible in the dark, streamed out toward the finger. Seafaring people often witness the same phenomena at the end of spars, tips of masts, booms, etc.

During the storm mentioned, one of the apprentice operators undertook to cut out the office by straddling a pair of tongs across the wires outside the office window. Climbing upon the operating desk—we stood up in those days—he reached, touched the wire and sat down on the floor without accomplishing the wished-for result. The discharge in this case was through a dry table, a dry room in the second story of a brick building, with a good ground terminal. The young operator has, since those days of boyhood, occupied many prominent positions, is still in electrical pursuits and well to the front as a scientist; but his first experience taught him that tongs are not good cut-outs for use in a thunderstorm, "in the manner and for the purposes set forth."

The decorations in honor of General Grant have been a source of no little annoyance to the electric light, telegraph and telephone people. Not one in a hundred of the decorators has the least idea that there is either annoyance to the proprietor of a circuit or danger to property or person in tangling *dry cloth* around a wire of any description, when "dry cloth is an insulator, as everybody knows;" and the other ninety-nine neither "know nor care anything about it, anyhow," to quote from their own lips.

Decorations indicating respect for the departed hero have been carried to a great extent in Chicago, but fortunately have resulted in only two incipient conflagrations—in one case the result being a hole in an awning, and in another the quick disappearance of some very prettily arranged funereal decorations, the loss in neither case being worth mentioning.

No. 1999 of the gentlemen who are capable of taking the entire current from a sixty-light or so machine without flinching, has been heard from. This time he lives in Missouri. Two twenty-five light machines were connected in series, and the electrician placed himself in the circuit between the carbons of a burning lamp and lived to tell the story. Unfortunately for the evidence on the part of the defence, the shunt coil in the lamp which divided the current with him, has been thus far unable to assert its claims for salvage. If that wire had not been intact the gentleman would probably to-day have been sitting on a cold cloud in scanty raiment, decorated with a celestial harp, singing hallelujah and wishing that summer would come.

The Municipal Electric Lighting and Construction Company, at Minneapolis, of which W. A. Sheldon, A. S. Huey and F. C. Turner are announced as proprietors, is an organization of contractors for the wiring of buildings of every description, for electric lighting purposes, and incidentally pretty much every other sort of wire running. They have the agency for the Edison system in that part of Minnesota.

Apropos of the Edison, some radical changes have lately occurred in our local company, the Western Edison Light Company.

The recent decease of General Stager vacated the office of President, and also a chair in the Directory.

Mr. John M. Clark, formerly vice-President, has been made President, and Mr. A. F. Seeberger has assumed the duties of vice-President. The Hon. Robert Lincoln will occupy the chair in the directory, made vacant by General Stager's demise.

Mr. George H. Bliss, who has so long and earnestly labored in the role of General Superintendent of the company, has handed in his resignation, to take effect on the 1st of September or before, if this can be done without inconvenience to the company.

In making this move Mr. Bliss is actuated by no feelings of disappointment or unkindness toward the company, and he parts with his long-time associates with regret; a feeling which is reciprocated by his brother officers and the employes of the company. During his years of labor in the electric light field, Mr. Bliss has been repeatedly tempted by good positions in other lines of business, but has respectfully declined to forsake Edison and his system. The present proposition came from the National Electric Service Company of the United States, a general organization for the manufacture, sale and installation of Johnson's electro pneumatic apparatus for controlling the temperature of apartments and buildings of all kinds. A full description of this apparatus was given in the REVIEW in May last.

The position in the new company accepted by Mr. Bliss is that of secretary, with the management of a business which gives every indication of future thrift and success.

The Western Electric Company have recently booked orders for multiple switch boards as follows:

From Paris, France, one board equipped for one thousand wires with additional capacity for three thousand more, as needed. From Montreal, Canada, a board of 3,000 capacity, equipped for 2,000; Melbourne, Australia, orders an additional section of 200 wires, and Milwaukee, Wisconsin, orders two similar sections, or terminal facilities for 400 new subscribers. The Western Electric has also just received an order for an annunciation with 360 drops, for West's new hotel, Minneapolis, Minn.

Local storms continue to be reported in every direction, usually accompanied by peculiarly brilliant electrical displays, and fierce thunder. On Sunday, the 2d inst., Chicago was visited by the most severe rain storm in many years, if the oldest inhabitant can be believed. In the early morning the rain commenced falling, and continued for about nineteen hours without cessation. During this time a remarkable quantity of water fell. Jupiter Pluvius had it all his own way, the thunderer rigorously abstaining from any demonstrations.

During the 19 hours no less than 5.65 inches of water fell, flushing every sewer and nearly every Chinese laundry in the city, besides more important business and resident basements.

The records of storms lately chronicled abroad are still being posted. In Paris, during a late severe demonstration, a portion of the bank of the Seine under one of the bridges caved, and no less than a dozen persons were precipitated into the river, the majority of whom were lost. Lightning struck the church of the Madeleine, and a newsvender in a kiosque near by was half paralyzed. Animals were killed and fires occurred in various portions of the city. In the department of Charente, a telegraph repairer was killed by the current upon the wire, while mending the line. In Chartres the dragoon barrack was struck, and several persons injured, one being struck blind, while several were killed outright. At the depot of the Rhone, at Charensal, at Aix-la-Fayette, soldiers and others were killed. Chalons also reports deaths from the same cause.

In the department of Doubs, hail accompanied the death-dealing lightning, and in other localities the hail fell two to three inches deep. Among the more curious results of the storm, two cases are peculiar. The bell of a church at Vinca, was struck, and considerable damage done the building; and at another point lightning descended upon a poplar tree, and a passer-by had his shoe forcibly torn from his foot without experiencing any other inconvenience.

At Lynch's stock exchange office the following figures are given as values of telephone stocks at the close of the 7th inst.

Central Union, 59 to 60; Chicago, $3.75; Great Southern, 50 to 55; Iowa Union, 23 to 25; Michigan, 68 to 70; Missouri & Kansas, 56 to 58; Rocky Mountain Bell, 50 to 55; United, 15 to 17.

Chicago, Aug. 13th, 1885.

THE INTERNATIONAL TELEGRAPH CONFERENCE.

The International Telegraph Conference opened its sessions in Berlin, Aug. 10th. Dr. Stephan, Imperial Minister of Posts and Telegraphs, was chosen President. The rules of procedure observed at the International Telegraph Conference in London were adopted. Two committees were appointed, one to consider the various propositions placed before the convention respecting telegraph tariffs, and the other on technical questions connected with the working of telegraphs. It was found on the assemblage of the conference that the mass of business which has been placed before the body for discussion will make necessary a session of from four to six weeks. Papers were read bearing on the proposal to compile statistics relative to electrical measurements of the effects of atmospheric currents and thunder-storms. It is believed that the voting in the conference on Prince Bismarck's proposition to establish a uniform tariff for all Europe on messages passing from country to country of 4 or 5 cents a word will be very close. The Eastern Telegraph Company strongly opposes the proposal on the ground that the company's receipts would be seriously diminished if it had to transmit messages to and from the borders of Europe for anything like 5 cents a word.

ELECTRIC LIGHT, TELEPHONE AND TELEGRAPH NEWS FROM KANSAS CITY, MO.

[Special Correspondence ELECTRICAL REVIEW.]

Heretofore the Edison Electric Light Company has not been represented in Kansas City. We have the Brush, Fuller, Thomson-Houston, and one or two other small concerns, but no Edison and no incandescent system. Now, however, we are in a fair way to have both. An agent of the company, Mr. W. Preston Hix, from St. Louis, has been in the city for the last two or three weeks, putting in an Edison incandescent plant in the Coates House, one of the leading hotels in the city. This plant is largely for exhibition and advertising purposes. If it proves a success and will give satisfaction, the intention is to organize a company with $100,000 capital, to further extend the system throughout the city.

A movement has lately been started by local parties, to establish a first-class electrical supply depot in this city. Eastern companies have also been writing for information, with a view of moving their plant and business to the metropolis of the West. This is as it should be. Kansas City is a good field for such an investment, and it is time we had a concern of this kind, capable of undertaking a little more than fitting keys and putting up door bells.

"The Pacific Telegraph Company," the latest progeny of the Bankers and Merchants', and the Pacific Mutual Telegraph Company, are already at work and making rapid progress with their line building. General Superintendent George M. Myers tells me that they have a large force of men at work between St. Joseph and Omaha, and by the time this reaches you they will have 100 miles of poles in position. They contemplate putting up about 1000 miles this summer.

Mr. Samuel Roberts, the veteran old-timer from St. Louis, has accepted the position of manager for the Pacific Telegraph Company at Kansas City, and is now signing pay rolls and time checks for that corporation at this point.

The Missouri and Kansas Telephone Co. is booming as usual. They average two or three new subscribers per day. They have lately put the seventh multiple switch-board in position. This increases their capacity to 1,400 subscribers. They have now about 1,200. They have lately built a new territorial line to Liberty, Mo. They have used No. 14 copper wire and paper insulators, and covered tie wires. It works well, and being something new in Liberty is well patronized by the business men of that town.

The hot wave of the past two weeks has caused several severe electrical storms in the vicinity. During the progress of one of these last week, the lightning struck the cupola of the Gillis Opera House. It glanced off without going to the ground, causing but little damage.

The all-absorbing topic here, as elsewhere, is the death of General Grant. The citizens, regardless of party and politics, have very generally draped their residences and business places. The Missouri and Kansas Telegraph Co. have made the finest outside display in the city. Their two office poles (60 feet in height) are draped to within ten feet of the ground with white and black. They put a small ornamental pole on the front veranda, with a picture of the General fastened to the cross-arms. From each side of this small pole streamers extend to the top of the two office poles. The effect is pleasing and unique, and has been very much admired. The Pacific Mutual Telegraph Company has also shown its respect in the usual form.

MONITOR.

Kansas City, Mo., Aug. 9.

All who attend the National Electric Light Association meetings, commencing next Tuesday, should not fail to remember this office with a call. We shall be pleased to see you.

The consolidation of the Brush, Weston and Merchants' electric companies, in Boston, was consummated on Tuesday. The new company has 700,000 shares, of which the Brush interest obtains 250,000 shares and the Weston and Merchants' 225,000 each.

An exchange says: "Since the introduction of electric lights at Bar Harbor, the number of wedding engagements made there has perceptibly decreased." This deserves prompt consideration. The electric light will rapidly lose its popularity, we fear, if its all-illuminating rays prevent love-making.

From an official of the Missouri Pacific we learn that the agent of that road at Argyle, near Fort Worth, was taught telegraphy and station business by the former agent; he afterwards offered to run the office for twenty-five dollars less than his teacher received; his offer was accepted, and now the former agent mourns the loss of a good situation and kicks himself for his short-sightedness.—*Texas Rail and Wire.*

The second annual report of the directors of the Edison and Swan Electric Light Company, Limited, England, for the year ending June 30, 1885, states that the accounts show a profit of £12,354. The directors hope to transfer the lamp manufactory from Newcastle to London in the coming autumn. The lamp factory at Newcastle has been working to its utmost capacity. The returns from the Admiralty and other customers as to the duration of life of the lamps supplied by the company are very satisfactory.

Telephonic News

*** The "Strong Current Protector" is being adopted in all the exchanges of the New England Telephone & Telegraph Company.

*** The employees of telephone exchanges in the West seem to know how to have good times. After enjoying telephone balls, they now commence on moonlight river excursions, the employees of the Kansas City exchange enjoying their first annual excursion the evening of August 6th.

*** The Boston branch of the Western Electric Company is being transferred to New York; a large portion of the plant, however, is being disposed of to Mr. A. L. Russel. Mr. Frank Harrington is in Boston representing the Western Electric Company in the final settlement of the business in that city.

*** A short time ago a New Hampshire man wished to run a telephone wire from his office to his residence. The best route lay over a cottage wherein resided two venerable maiden ladies, one of whom answered his request for permission to use the route with the statement that, while she "should be glad to accommodate him, the noise made by people constantly talking over her head would be too annoying to permit it."

*** During the late campaign of the French troops in Tunis, a telegraph established between Souk-el-Arba and Medjez-el-Bad suddenly broke down, owing, as was afterwards discovered, to a large snake having coiled itself round a post and the wires, thereby connecting the two despite the insulator, and drawing off the electricity, which passed through the snake's body to the post, and thence into the ground. Communication was kept up by means of a telephone, which is extremely sensitive to feeble currents.

*** In order that direct telegraphic communication may be had with Her Majesty's royal yachts in Cowes Bay, to enable them to immediately carry out sudden orders from Osborne House, a telephone wire has been recently laid down from the billiard room in the royal residence to the royal landing stage, East Cowes, off which lie at anchor the Alberta, Victoria and Albert, and other royal yachts. The telephone has been found to work admirably, and to be of the greatest possible use to Queen Victoria. The telephonic appliances consist of Johnson's patent transmitter and Bell's patent telephone.

*** About 4 o'clock Saturday afternoon, fire was discovered in the roof of the New England Telephone building in Central street, Lowell, Mass., and, although speedily extinguished, nearly all the wires were disarranged and telephone communication in the city and business suspended. Word was sent to Boston, and an extra gang of men was put at work, and a temporary service was again arranged by Sunday noon. Mr. Sargent, the local superintendent, was unable to determine the cause of the mishap. Beyond the expense of repairing the connections, the loss to the telephone company was slight.

*** Our correspondent at San Antonio, Texas, sends us the following: "The Southwestern Division of the Erie Telephone Company, on August 1st, took control of probably the longest continuous telephone line operated by any one telephone company in the United States. Said line is 600 miles in length, reaches from Denison, through Dallas, Waco, Austin and San Antonio to Eagle Pass, on the Rio Grande frontier. Connecting with this main line are branches from various points, aggregating fully 1,000 miles additional pole line. No isolated lines (and they are numerous) are included in the above."

*** "This is a bad day for the doctors," said an Auburn physician, one rainy Tuesday. "It's one of the telephoning days. All of your patients are telephoning. They want to see the doctor because it's lonesome, and they need company more than medicine. The doctor on such a day as to-day is on a level with the horse railroad conductor in point of comfort, minus the rubber coat and boots and hat."

*** The answer of the New Jersey Telephone Company to the bill of complaint of the American Bell Telephone Company, which has applied for an injuction, has been filed in the United States Circuit Court. In the answer it is denied that Bell was the original inventor of the patents in dispute, and that the improvements have not been known and in public use before their adoption by either company. The New Jersey Company holds that the Bell Company came into possession of the patents irregularly. It asserts furthermore that the methods of transmission have changed since the patents were granted, and that no infringement has taken place.

*** The New England Telephone and Telegraph Company makes another fair exhibit for May. Construction expenses were light, and the net sum of nearly $15,000, added to that of previous months, makes a total of $77,500 for the first five months of the year. The figures are:

	May.	Since Jan. 1.
Gross earnings.....	$78,233.00	$385,627.95
Expenses.....	55,912.27	268,760.39
Net earnings.....	$22,320.73	$116,867 56
Construction.....	7,322.02	39,367.24
	$14,998.71	$77,500.32

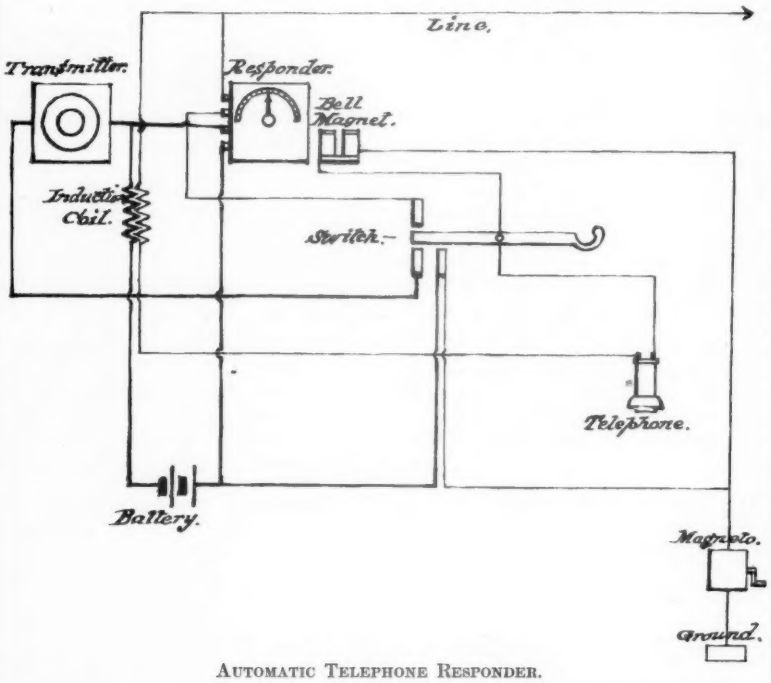
*** The Quincy, Ill., *Whig* says: The City Council last night passed an ordinance regulating the construction and maintenance of telephone poles and wires in Quincy. The provisions of the ordinance were such as some of the Aldermen were aware could not be accepted by the telephone company, but this made no difference with them, and they went at the business in no spirit of concession. Judged by the statements made by the authorized representative of the company, the telephone officials were disposed to be liberal—at least fair and honorable. The Aldermen, however, seemed to be imbued with the idea that they could get a good deal more than was offered, and magnified their power to tax what has grown from a privilege to a public necessity. No other corporation doing business in the city affords the service and benefits provided by the telephone company, and in no other case has there been an effort on the part of the City Council to apparently cripple operations and impose unjust burdens. Unjust, at least, in comparison with the conditions demanded by other cities, where the company is doing business the same as it is doing in Quincy.

*** The storms last week played sad havoc with the telephone and telegraph wires.

*** General Superintendent Beach, of the Central Union Telephone Company, has issued notice to Indiana patrons, in effect that the company will continue its toll-line business in this State, pending a decision of the Supreme Court, as heretofore, and if an early decision can be reached no collections for use of the lines will be made until a construction of the law has been obtained. Should the case be sustained, the company's charges on such business will be as prescribed by statute; if otherwise, then the present rates will be collected. In the meantime subscribers will be furnished with regular statements, as heretofore, and those statements will accompany bills when presented, so that no misunderstanding will follow relative to the amounts due.

*** The opponents of the Bell telephone are certainly tenacious of life and persistent in their efforts to win. President Van Bamthusen, of the National Improved Telephone Company, has been in New York for the last two weeks collecting evidence to be used in the new trials. The suits are to be pressed immediately. The first suit will be entered against the Bell Company at New Orleans by the Western Pennsylvania. A second suit will be begun at Memphis, Tenn. Mr. Van Bamthusen says in relation to the suit: "In this suit, as well as in the preceding one, the proof has been collected with the utmost care, and all the details have been most carefully arranged. In a word, we have made the completest preparation. The case which was tried in Pittsburgh before Judge McKennan will not come up in his court again. It will undoubtedly be taken to the Supreme Court of the United States, and a last and final settlement of the case made there."

*** The Dorsett Underground Wire Company is endeavoring to secure an ordinance for operation in Detroit. Some of its members are very prominently interested in telephone and telegraph companies. The President is Hugh McMillan, and other stockholders are W. H. Jackson, E. C. Preston and John B. Corliss. Daniel H. Dorsett, of Chicago, the inventor of the underground conduit, which it is proposed to use, was in Detroit recently, and said that the late terrific storms in Chicago, which were certainly the severest test to which the conduits could be put, had not disturbed their operation there. John B. Corliss, of the new company, said yesterday: "We mean business. Just as soon as we get our ordinance we propose to go to work laying the conduits. Mr. Dorsett's underground system is working successfully in Chicago, and is the only one that has so worked in the country. We will have six miles laid by the 1st of November. The presence of such men as McMillan and Jackson—telephone men—in our company is a guarantee of the efficiency of the system."



AUTOMATIC TELEPHONE RESPONDER.

The Automatic Telephone Responder.

This invention consists of certain improvements in electrical communication whereby it is claimed a person calling up a distant station, or subscriber to one, is automatically notified whether any one is there present to receive his message; or to be put in communication with another station or subscriber; or is notified at what time when the called station will be attended, or ready to receive messages, if the attendant be absent; thus saving considerable time to the operator making the call, as he will refrain from constantly renewing the call, as he is now obliged to if it is not immediately replied to, but will wait until the time indicated by the responder before he calls up this station or subscriber again.

It will be conceded that the Metropolitan stations have all the occupation they require without loss of time, and the repetition of unanswered or "dead calls" as they are technically termed, are as unsatisfactory to the customer as they are to the operator.

The design and object of the Responder is not limited only to transmit the hour at which the subscriber will return, but is capable also, by means of an ingenious and simple arrangement, to respond automatically a code of signals from a great variety of messages that may be designed for the character of business in which the subscriber may be engaged.

The above cut, or diagram of the circuit, shows that the automatic responder is practically a part of the calling bell circuit, and does not enter into the transmitter circuit, the former being always cut out when the transmitter is placed in use by taking the Receiver off the hook, or similar device for that purpose.

The growth of telephonic communication in the United States, as well as elsewhere, within five years, exceeds the development of any other specialty. At this time the service has nearly or quite reached an issue of 400,000 instruments, which yield the owners a rental commensurate with the value of the invention.

This fact, as well as the increasing demand everywhere, attaches to the invention of the Responder a certain interest, if it enlarges even to a moderate extent the usefulness of the system referred to. The patents issued were dated the 9th and 30th of June last, and are owned by the Equitable Electric Company of New York.

Underground Conductors.

ERRATA.

My hieroglyphics have been the occasion of three errors in my communication published in the ELECTRICAL REVIEW of August 8th.

The *first*.—The word "conductors" should take the place of the word "conduction," so that the sentence will read "the action on the particles of conductors differs only in degree," etc.

The *second*.—Let the sentence read "This anomaly is explained by the fact that conductors differ materially in effect of polarization, according to time."

The *third*.—Let the sentence read, "the force exercised by 'conduction' will bear a relation to the conductivity of the substance separating the conductors"

W. C. BARNEY.

*** Mechanical telephones are just now receiving their share of public notice, chiefly through the medium of the daily press. One of the recent purely mechanical ones consists of a diaphragm or sounding board made of strips of willow wood closely interwoven together and varnished. This wood is found to possess a high degree of sensibility to sound vibrations. In the center of the diaphragm is fixed a disc of metal from which the communicating wire passes to any point desired up to two miles. The instrument, being enclosed in a small wooden case, can be easily fixed, and remains ready for use, requiring no attention. Various methods were adopted to try the utility of the instrument, and in all cases it is reported to have fully met the demands made upon it.

About Telegraph Works.

"There is no danger of operators being struck by lightning in the telegraph office," said Chief Operator Mingle, of Philadelphia, in a recent interview, "unless an operator is foolish enough to put his fingers on the brass parts of the instrument while the lightning is flashing. I have known men to have their fingers burned, but that was the result of their own carelessness. If a man simply has his fingers on the gutta percha part of the key, which is a strong non-conductor, there is no danger. I think a telegraph office is the safest place to be in time of a lightning storm. Besides having lightning arresters on the dome connecting with the three hundred and sixty wires that enter the building we have arresters on our quadruplex instruments, because they are very valuable, and the wires are very delicate. If we didn't have arresters on them a very little lightning would tear them to pieces. The ordinary relay instruments are stronger and are connected to thick wires and they are not in any danger. Still I have known all the instruments in an office to be burned up and the desks splintered into kindling wood by one flash. That was because there was no lightning arrester at the entrance of the wires. Of late years the telegraph companies have been very cautious and many improvements have been made on the lightning arrester that was used in the early days of telegraphy.

"Some years ago," continued Operator Mingle, "I was working at Brownsville, Pa., and I remember that a well-known iron man of Pittsburgh had just received a message that his wife was very low a hundred miles away. It was a country telegraph office and he kept sending messages every few minutes. Every reply told that his wife was worse. While I sat at the open window sending and receiving messages a fearful thunder storm came up, the lightning flashed on the wires and ran into the office and danced on the instruments in big blue flames. I was half blinded by the vivid light, and at last, as I heard another message coming, I turned to the worried man, who stood at the counter, and I said: 'I can't sit here any longer. I'll have to wait till the storm is over. There's another message coming, but I can't receive it now.' The man said to me: 'Go on and let me hear what it is and I'll pay you well for it.' I started to take the message just as another flash of lightning came. It set fire to the instruments and twisted them into a shapeless mass. I found out afterward the same flash knocked me senseless to the floor, and tore the back out of the chair I was sitting on. When I regained consciousness my muscles were all paralyzed and the anxious, worried man was nowhere to be seen. He had fled and an hour afterward he sent a boy with a message to me saying that if any more messages came to send them by the bearer. The next day he sent me a check for sixty dollars. I was all right in a couple of hours and the numbness left me."

Chief Operator Mingle said that overhead wires were a great protection to buildings in time of a lightning storm.

"The more wires that are carried over a building," he went on, "the less danger there is of its being struck by lightning, provided, of course, that the isolation of the wires is perfect. The lightning will strike the wires and won't leave them and the building is safe. A telegraph wire is the best conductor, and, although it may look ugly to have a web of wires woven over the roof of a building, they are as good as an insurance policy almost."

Speaking about the effect lightning has on the receiving and sending of telegraphic messages, Operator Mingle said:

"Lightning always delays business. It takes longer to send a message on account of the great volume of electricity on the wire. To-day, during the storm, we could not work as fast as we can when there is no storm. Sometimes a protracted storm puts us a good deal behind with our work and there are times when we can't use the wires at all when the lightning is dancing along them."

The test men of the telegraph company have charge of the daily testing of the wires with a little instrument similar in appearance to a barometer, which they attach to the relay instruments and ascertain by the different little dials the strength of the current and other technicalities. When a wire breaks down on a section the operator, when he opens his key to transmit a message, can tell in an instant if the circuit is broken. The line from Philadelphia to New York, ninety miles long, is known as a section. If an operator finds that the wire is broken he tells the chief operator. The test man then adjusts the testing machine, which is called a galvanometer, and the little hand on one of the dials shows how many miles away the wire is broken. If the wire is down at Trenton, for instance, the indicator points to thirty-two miles. Then the company know exactly where to send a lineman to repair the break. Telegraph operators who have worked for years at instruments sometimes suffer from what they call telegraphic paralysis. Chief Operator Mingle said that he had known of cases where an operator's arm would become paralyzed from the constant working of the fingers in transmitting messages for nine hours every day. There is an operator in the telegraph room of the Associated Press who has lost the use of his thumb and forefinger of his right hand from constant telegraphing. Now he only receives matter, and in writing with his pencil he holds it in his fist just as a dagger would be held in the hand, being unable to use his fingers to write.

There are not more than a dozen cable operators in this country, that is, operators who can receive a message from across the ocean. The wires in the ocean cable have a very great induced current to overcome and the sound is too feeble to read by ear when it reaches this side of the sea. All Atlantic cable messages are taken by flashes. The telegraphic alphabet of dots and dashes dance on a looking-glass from the wires and the operator, who sits in a dark room, reads the little purple dashes as they dance off the wire on the looking-glass. The operator has to sit in a darkened room, so that the reflection of the flashes can be plainly seen on the mirror. He has to watch the glass continually while on duty. Chief Operator Mingle said that the constant watching was trying to the eyes and that a man's sight would be almost ruined in four or five years. Cable message receivers work shorter hours than other operators, and receive much better pay.

.... The New Atlantic Telegraph Company has opened for business at Portland, Me.

....Thomas Moran and James Smith were arrested at Philadelphia, last week, by Detectives Colburn and Crawford, on the charge of stealing a large quantity of copper wire from the poles of the Bell Telephone Company and the Postal Telegraph Company. The prisoners were identified by several witnesses at a hearing at the Central Station as men who had been seen cutting the wires and carrying them away in the neighborhood of Conshohocken and Olney. It is estimated that in the past few weeks over thirteen miles of wire has been stolen from the poles of the two companies. The officers of the companies declare that within the past year over a thousand dollars' worth of wire has been stolen, entailing an incidental loss by the interruption of business of several thousand dollars. Detective Colburn went to work on the case several years ago and located the supposed thieves, but did not make the arrest until conclusive evidence had been obtained against them. The two men under arrest protest their innocence, but, as they were positively identified by several witnesses, they were committed in default of $1,000 bail each for trial. A third man, who is said to be implicated in the thefts, will be arrested to-day. Both Smith and Moran are old linemen, and were formerly in the employ of the Western Union Telegraph Company. Smith came to this city during the telegraphers' strike two years ago, and was active in his efforts to organize a general strike among the linemen.

.... The receipts of the English telegraph service from April 1st to July 18th, 1885, amounted to £525,000, as against £520,000 received from April 1st to July 19th, 1884.

.... He was reckoned a cool officer, and had been selected for several hazardous enterprises. He had been to Candahar with Roberts and with Burnaby to the Soudan. He left the land of the Pharaohs when fighting was over, and he had just reached London when his wife wired that she would be at Euston by express, and that she hoped he would be waiting for her; but those villainous telegraphists conspired against them, and the soldier-husband, who had not known fear in Afghanistan, and who had not flinched when Arab spears were within an inch of his heart, trembled to meet the woman he prized dearer than life as he read her message, "So glad you are safe. Reach town Monday evening. Wail expreshuvon expect you wailing. Be sure and wail."—*The Telegraphist.*

.... The United States has more than three times as many telegraph lines, double the number of telegraph offices, and forwards twice as many telegrams annually as any other country on the globe. The figures for the United States are: Length of line, 163,940 miles; number of offices, 14,402; messages sent last year, 57,942,247. Russia comes next in miles of lines, with 53,736, but is far behind in number of offices and telegrams sent. France, Germany, Austria and Australia rank ahead of Great Britain in miles of line, having 45,878, 45,070, 31,121 and 21,831 miles respectively, though Great Britain, with 31,345,861 telegrams forwarded, sends a few more than one-half the number sent last year in the United States. In number of offices in Europe, Germany, with 7,366, has the most, and Bulgaria, with 37, the least.

.... The Baltimore and Ohio Telegraph Company won at least a temporary victory at Harrisburgh, Pa. The Highway Committee of Councils, to which the select branch referred the joint resolution passed by Common Council granting the company the privilege of bringing its wires into the city on the electric light company's poles and providing for the passage of an ordinance compelling the placing of the wires underground within sixty days after the passage thereof, at a special meeting unanimously passed the resolution. A leading lawyer protested against the passage of the resolution on the ground that the citizens of Harrisburgh had no guarantee that the new company would do what it proposed. J. H. Hevlin, superintendent of construction of the Baltimore and Obio company, who was present, said that his company meant to do just what it proposes. After the adjournment of the committee a special meeting of Select Council was held, and the resolution passed that body by a slight majority. Mr. Hevlin says, unless stopped by the obstruction tactics of the opposition, his company will stretch wires in the city at once.

.... Mr. Charles Selden, district superintendent of the Baltimore and Ohio Telegraph Company, is pushing the construction of the lines on the new B. and O. Railroad to Philadelphia. The telegraph line has been completed from Baltimore to the south side of the Susquehanna, and Mr. Selden will continue it on from the north bank into Philadelphia. His district has recently been extended to include Philadelphia. Mr. Selden is also arranging the contract for poles for extending the B. and O. wires from Washington to New Orleans, which construction work in the South is the next important move contemplated by the company. Pending the settlement of the status of the Bankers and Merchants' telegraph system, the B. and O. has not done much construction work, because those old lines were practically on the market. The Western Union has absorbed the Southern and American Rapid lines, which were in the B. and M. combination; and the field being now practically clear, it is said the B. and O will go ahead and extend its territory. The B. and O. Telegraph officials do not pay much attention to the rumors that Mr. Garrett will sell out to Mr. Gould, and there is evidently very little in them.

TELEGRAPHIC

.... The American Train Dispatchers' Association, which was organized only a year ago this month, now numbers 746 active and 10 honorary members—a remarkably rapid and healthy growth.

.... "So rapid is the transmission of the electric current along the lines of the telegraph wire that, supposing it were possible to carry the wires eight times around the earth, it would but occupy one second of time."—*Doidge's Annual.*

.... The Queen of England was the first to send a telegram to America. The message was one of congratulation to the President of the United States, who at once replied. Her Majesty's message and the President's answer cost £500 each, being £1,000 for the use of the cable for rather less than an hour and a half.

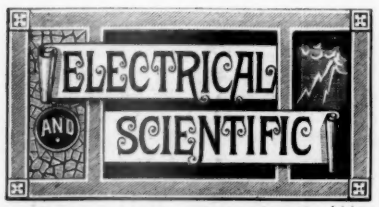
....The certificate of incorporation of the New York Auto-Telegraph Company has been filed in the office of the County Clerk. The lines of the company are to run from Battery Place and Broadway to the building of the United States Post Office in Yonkers. The capital stock of the company is $2,000,000, divided into 20,000 shares of $100 each. Its corporators are Henry Van Schaick, Robert D. Radcliffe, and Augustus T. Gillender.

.... In about a month the Canadian Pacific Railway and telegraph service between Montreal and Winnipeg will be thrown open to the public. In telegraph circles there it is said that gigantic efforts were made by Jay Gould to get control of the Canadian Pacific lines. Negotiations are on foot for laying a cable to connect the Canadian Pacific system with Australia, China and Japan. The United States connections will probably be over the Vanderbilt railway systems.

.... The secretary of the Military Telegraphers, in announcing the meeting in this city, August 19th and 20th, says: "It is probable our next reunion will be deferred two years. Let us therefore embrace this remarkably auspicious opportunity of meeting our comrades, who in the Eastern are anticipating a joyous welcome for those of us of other States. Let us be boys again for two days, and enjoy good cheer with comrades and Old Timers. We will renew our youth while we pave the way for congressional recognition—for justice to the living and to representatives of our dead."

.... The American Telegraph Company has just opened telegraphic communication between Chilian, Talcahuano, Concepcion, Coronel and Lota, and it is expected that the line in course of construction between Chilian and Talca will be completed by the end of the present month, which will place this port in direct communication with the southern portion of the republic. Mr. Smiles, representing English holders of Peruvian bonds to the amount of £27,000,000, arrived in Lima recently. A telegraph line is to be erected between Arica, in Peru, and Lopaz, the capital of Bolivia, the tariff to be two Bolivian pesos per word. The line is to be completed within six months. The Peruvian telegraph line is now in operation to Casma.

.... Three thieves drove in a wagon from West Conshohocken to Bala Station on the Pennsylvania Railroad, seven and one-half miles, a few days ago. They halted at each telegraph pole, mounted it, and took down two lines of heavy copper wire. When asked what they were doing they said they were company employees, and intended to put up a heavier wire. In this way they got away with fifteen miles of wire, valued at $600, belonging to the Postal Telegraph Company. The wire had not been in actual use for some time, and this fact was evidently known by the thieves. They were traced to Philadelphia and arrested. The property was found in several junk shops. The wire weighed 125 pounds to the mile.



* * It is proposed to construct a small aerial railroad in Paris, on the American model, the motive power being supplied by electricity.

* * It is stated by White Mountain guides that lightning never strikes a beech tree, seldom an ash, but frequently the hemlock tree receives the electric discharge.

* * Montana's output of gold, silver and copper this year will reach $30,000,000—much the largest figure ever attained—and Montana thinks herself on the eve of a remarkable mining development, which will rival in magnitude that of Colorado in the "seventies," and be less speculative and more enduring.

* * Experiments in distance telephoning have been recently carried out between Albury, Melbourne and Sydney. An extra thick wire between the two capital cities was used, and speech between Albury and Melbourne, a distance of 187 miles, was clearly and distinctly heard, the identity of the speaker being easily recognizable.

* * Last fall a man at Clyde, N. Y., had a number of stumps which he wished to remove. He bored holes in them, inserted saltpeter, filled up with water and then plugged the holes. About a month ago he took out the plugs, poured in kerosene oil and set fire. The stumps have smouldered away without blazing, and now there is nothing left of them but ashes.

* * Long and deep canals in the Sahara Desert have frequently been advocated, and are not impossibilities. Their advocates dwell not only on their advantage to commerce, but also on their probable effect in making barren land fertile by means of irrigation. Engineering talent might seek in many quarters before finding a nobler task than that of reclaiming these vast tracts, and turning sterile sand into grain fields or pasture.

* * A dispatch from Minneapolis, Minn., states that a tar well connected with the purifying works of the gas-works there exploded about midnight the other night. The coal shed and tar well are total wrecks, but the gas-works are intact. One of the workmen shut off the gas needlessly, plunging the whole city into darkness, and giving rise to a report that the gas-works had blown up. It was kept turned off for fear of endangering life and property from jets which had been left burning during the night.

* * Prof. Palmieri, of the Vesuvian Observatory, finds that the atmospheric electricity is usually positive in clear weather; if negative, a fall of rain may be inferred to be in progress at some little distance. Two maxima and two minima daily are noticed in the electric indications, this periodicity being disturbed by atmospheric movements. With dew, rain or an overcast sky the indications increase in intensity, and are stronger in spring and autumn than in summer and winter. A rain zone is positive, but is surrounded by a negative zone, which in turn is surrounded by a zone of positive electricity. Thunder and lightning, according to this observer, did not occur without rain.

* * The Panama Canal directors have asked the French government to sanction a new issue of 500,000,000 francs' worth of bonds. Premier Brisson opposes the demand on the ground that there is a deficit in the budget and the country cannot take other responsibilities. The company can issue with the government's approval. It is estimated that less than 10 per cent. of the excavation has been done, and already the estimated cost, 120 million dollars, has been reached. It is probable that the entire cost will amount to more than $500,000,000, and there is little probability of that amount of capital being procured. The prospects of the canal company are extremely gloomy.

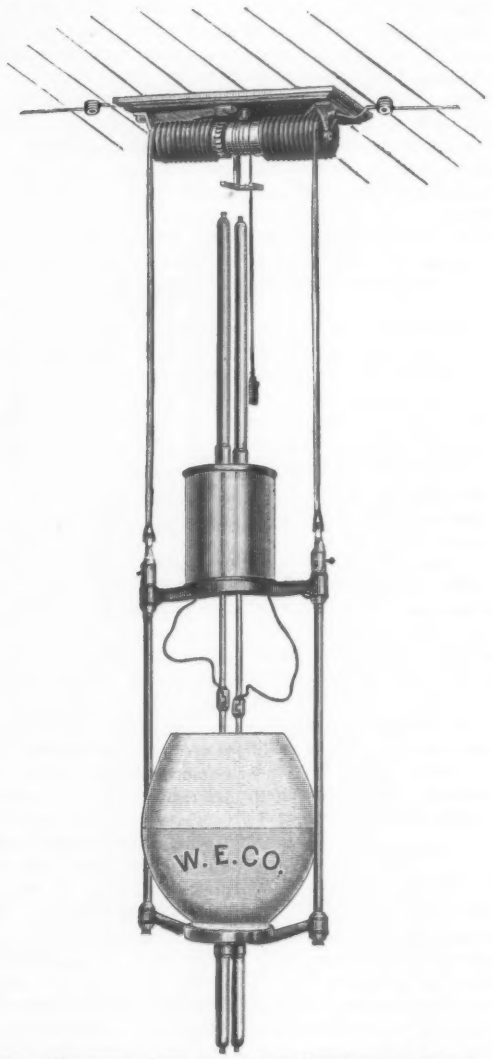
* * Even the invisible echoes are utilized for the good of man, according to a note printed on a pilot chart of the *North Atlantic Ocean* for the current month. It states that experiments recently made show that by noting the echoes from bodies near ships wrapped in a fog the danger of collision may be considerably lessened, if not entirely avoided. By a systematic observation of the phenomenon of repeated sound, navigators on the great lakes have learned to sail their ships from headland to headland, and it is therefore suggested that if shipmasters while on the ocean during foggy weather would carefully observe the echo they might detect their nearness to icebergs or other vessels, or to the shore, and thus be enabled to take such precautions as the circumstances might permit.

* * M. J. Kergovatz, a chemist of Brest, has discovered a mode of disposing of the mortal remains of humanity which he considers preferable in every way both to inhumation and cremation. His system is an antiseptic one, of a simpler character and much less expensive than the old process of embalmment. All that is necessary is to rub the body over with a solution of plumbagine and then plunge it into a copper bath. But copper being rather an expensive mineral, zinc may be substituted for it in the case of the poor. On the other hand, persons of luxurious tastes may use silver or gold if they please, the effect being the same. The discover has tried his system eleven times on the human subject and on a hundred dead animals, and he has never once known it to fail. Among the manifold advantages which would result from the adoption of this system, M. Kergovatz mentions one which, if generally availed of, will strike a death blow at one of the fine arts. By simply prolonging the duration of the bath the body is rendered as hard and as indestructible as granite, and thus the country is provided with "ready-made statues of its great men," and the State and the communes will be saved in future the considerable expense which our present dependence on the statuary art for memorial purposes imposes on them.

Apparatus for Suspending Arc Lamps.

All who attended the Chicago Meeting of the National Electric Light Association will remember having seen on exhibition at the Grand Pacific Hotel the apparatus belonging to the Western Electric Company, used for raising and lowering arc lamps we illustrate in this edition. The inventor is John Young, a very capable gentleman connected with the electric lighting department of the Western Electric. It consists of a drum, smaller in the center, where the cord for raising and lowering the lamp is wound; at the ends of the drum the conducting cables are wound. By means of the cord and the pawl and ratchet device operated by it the lamp may be raised or lowered or held in any desired position. The device is an excellent one, and is meeting with favor wherever put in use.

* * An artesian well in Kern County, Cal., has been completed which gives a flow of 1,575,000 gallons in twenty-four hours, and the water rises 11½ inches above the pipe. The cost was only $700.



Western Electric Apparatus for Suspending Arc Lamps.

* * A recent German publication contains a description of a new electric plant that has been christened Phytolacca electrica, which possesses strongly marked electro-magnetic properties. In breaking a twig the hand receives a shock that resembles the sensation produced by an induction coil. Experiments made on this plant showed that a small compass was affected by it at a distance of about 20 feet. On a near approach the needle vibrated, and finally began to revolve quite rapidly. The phenomena was repeated in reverse order on receding from the plant. The energy of the influence varied with the time of day, being strongest at about two o'clock P.M., and becoming almost nothing during the night. It was also greatly increased in stormy weather; and when it rains the plant seems to wither. It is said that no birds or insects are ever seen on or about this plant. The soil where it grew contained no magnetic metal like iron, cobalt, or nickel, and it is evident the plant itself possessed this electrical property.

The Work of Prof. Alex. Graham Bell.

Professor Bell is actively at work upon problems of sound and electricity in a way that promises an invention of far greater importance, scientifically, than the telephone itself. His laboratory is an old-fashioned two-story house on Connecticut avenue, Washington, in the neighborhood of the British Legation, Stanley Matthews' house and the residence of Mrs. John Davis. He also has a private and secret laboratory over in Georgetown, where at present he has a most skillful workman engaged upon the forthcoming instrument. What it is, is known only to the professor and the man who is working at the idea. The inventor has said to his friends that if he succeeds the new idea will yield him greater returns than the telephone has. It is suspected, however, by those who have given some attention to the course of Prof. Bell's thought upon the subject that it is the photophone, or the use of electricity to reproduce over the wires the image of the person speaking before the instrument. Prof. Bell is a man of prodigious mental energy, and he is constantly developing new ideas and new applitions of electrical force for the production of useful machines. He throws them off as easily and carelessly as you can fancy. For instance, he made not long ago an instrument called the audiometer, perhaps not a dozen of which have been made. It consists of magnetic cylinders graduated to each other. These cylinders will indicate by measurement how much sound it is possible for a deaf person to hear, and if they can hear any at all. Prof. Bell has also devised an instrument which might be called the submarine telephone, by which can be ascertained by the echo from a stone dropped upon the bottom of the bay or river in which the craft may be floating, just what the depth is at that point. He has also utilized the telephone to record the echo at sea, which may show the distance of icebergs and other obstructions. Even a buoy can be distinguished by its use. Prof. Bell is gradually growing out of all business pursuits and devoting himself to the improvement of the deaf. He is constantly giving more and more time to his little school, where he has perhaps a score of pupils, most all of them wholly deaf, to whom he is teaching the art of sight language. He is training these little children so that they can distinguish from the lips and face of the person speaking what they say, and teaching them to imitate the proper arrangement of the lips, teeth and tongue, so that they may articulate sounds. It is understood that Prof. Bell is at work upon the problem of resolving heat at once into electricity, a result, if it can be obtained, that will greatly simplify and cheapen all uses of electricity.

* * Besides the gigantic tower that M. Eiffel proposes to erect for the Paris Exhibition of 1889, the center of civilization is to have another great tower, which is to be used for scientific purposes. M. J. Bourdais has presented to the French Society of Civil Engineers a project for the erection of a masonry tower 984 feet in height. After an examination of the different geometric profiles realizable, M. Bourdais has adopted the column as being more apt than any other form to satisfy the rules of æsthetics, and also as being the most stable. In fact, the highest chimney in the world—that of St. Rollox, near Glasgow, 433 feet in height—has been submitted to numerous storms without suffering from them, and as other chimneys exposed to great wind pressure have never given rise to any accident, it would seem that a cylindrical form is one that should be a adopted. M. Bourdais' structure would consist of a base 216 feet high, in which is to be established a permanent museum of electricity. Above this would rise a six-storied column, surmounted by a roof, forming a promenade and capable of accommodating 2,000 persons. The central granite core, 60 feet in diameter, would be surrounded with an ornamental framework of iron faced with copper. This would be divided into six stories, each containing sixteen rooms, 16 feet in height and 50 feet square, designed for aerotherapic treatment.

Electricity—What is It?

The electric light has become so common as to attract attention by its *absence* from the public places of villages and cities; its absence from private dwellings, stores, and shops where gas is used for illuminating purposes should, and probably will, not much longer be allowed. The air of rooms is not only heated by gas about twenty times as much as if lighted by electric lamps, but while the former rapidly consumes the oxygen in the air, produces carbonic acid and vitiates the atmosphere generally, the latter has none of these objectionable and unhealthful features. It view of these facts it would seem that even additional cost (which will not long continue) should not stand in the way of fitting up all new buildings with wires instead of gas pipes, and making similar changes generally as rapidly as possible.

No one pretends to know just what electricity is; scientists can only inform us that it is—electricity. But as many of the theories, the results of experiment and investigation, and the *say-so* of eminent text-book makers in numerous branches of sciences are daily being shown as falling short of finality—in some cases entirely wrong; so it will be with electricity. When investigators discover, and are honest enough to admit the fact, that what is called *electricity* is the direct operation of the Almighty influence which controls and regulates the whole system of created things, they and the world will be prepared to study the subject understandingly.

If this theory is considered false or visionary, we shall be pleased if it can be disproved by better evidence than the *scientific fiat*, "It is not so."—*Cincinnati Artisan.*

A Suspended Sword.

One of the aldermen, who was going down on a Michigan avenue car yesterday, looked so pale and worried that a friend felt compelled to ask if he was ill.

"No, not exactly ill," was the reply.

"Perhaps you are in trouble?"

"It all comes from a dream I had last night. I dreamed that I was sitting alone in my office when a little, sharp-faced man dressed in black walked in, sat down at the desk, and, as he helped himself to pen and foolscap, he quietly said:

"'We'd better begin at the beginning."

"'Beginning of what?' says I.

"'Of your official corruption,' he says, looking as cold and cruel as an iceberg.

"I wanted to rise up and put him out, but I had no strength to do it, and he writes away for a minute and then asks:

"'How much have you made out of the pavement ring?'

"'Three hundred dollars,' I replied, fool that I was.

"'And from the sewer ring?'

"'About $400.'

"'And the electric lighting?'

"'Five hundred.'

"'And the street railway ring?' he goes on, his eye looking right through me.

"'Well, $150 in cash.'

"'Very well, you will now sign this confession,' he says, as he handed me the pen."

"But you did'nt do it!" exclaimed the friend.

"But I did! I was just fool enough to write my name there."

"Well, it was only a dream, and, of course, there is nothing in it. I shouldn't feel bad."

"Well, I dunno. You see, I also dreamed that after I signed the confession a reporter grabbed on it and ran away, and I'm looking for the whole thing to come out in cold print any morning?"

—— The Brush Company claim that the Fort Wayne Jenney electric lighting system is a clear infringement, and has brought a number of suits against the Indiana company.

—— Mr. J. F. Morrison, of Baltimore, president of the National Electric Light Association, is in New York, and will remain until the close of the meeting of the association at the Union Square Hotel next week.

Like the Aztecs.

The electric light vied the moon in illuminating the veranda, but notwithstandir g their combined efforts Algernon and Augusta found a convenient place where the rays of light could only be perceived indirectly.

"Algy," said she, "this must be a good deal like the delightful evenings of Mexico, when the Aztecs ruled."

"I dare say; but who were the Aztecs, my dear?"

"Don't you know? Why, they were the people that said 'Tattenamquiliztli' when they meant kiss."

"Did they? Well, give us a 'Tattenamquiliztli!"

For a moment the moon and the electric light were both eclipsed.

—— The action which the Swan Electric Company, of England, has commenced against Messrs. Woodhouse and Rawson for infringement of their patents is down for hearing, and will probably be tried in November.

—— The people who live in the Fourth District, New Orleans, are not happy, because the lights do burn and attract bugs whose number and variety are as the sands of the seashore. One old bald-headed citizen is compelled to wear his pate done up in mosquito bar when he sits out on his gallery, and another one got thirteen bugs and ninety-six mosquitos in his mouth as he was taking a chew of tobacco. These little trifles worry the good people, and a concerted attack with axes on the electric light poles is being discussed in their dreams.

—— Owing to the prevalence of steam in dye houses, some difficulty has been experienced in adapting the electric light to the peculiar conditions which are required. This difficulty, however, seems to have been overcome, and, considering how necessary it is not that the dyer should be able readily to distinguish the various colors he has in hand, it is an unimportant achievement. Messrs. J. Bannister & Sons, dyers, of Leeds, have recently introduced the electric light into their works, and have obtained a satisfactory result. The lamps used are the Pilsen arc of 1,000 candle-power each, and they are run from a Phœnix dynamo, made by Messrs. Paterson & Cooper, at their steam factory, Pownall road, Dalston.

—— The Germania Club Garden, of St. Louis, is lighted by 100 incandescent lamps of the Heisler system. The power is furnished from the temporary station of the St. Louis Illuminating Company, now located at Heisler's Electric Works, where a 500-light station is temporarily erected, and ready for operation until the new station, at 212, 214, 216 Gratiot street, is furnished. The plans for the new buildings are now being prepared. Boilers, engines, and everything else are to be constructed on the most complete plan. Lights will be furnished to any part of the city. A company is being organized, with Mr. W. R. Allen as president, to introduce the new system throughout the city and country.

—— A most noticeable feature of the illuminations with which the festivities at Osborne were terminated, on the occasion of the marriage of the Princess Beatrice, was the electric installation on board her Majesty's yacht Victoria and Albert. It consisted of a group of 100 incandescent lamps arranged in the form of the letter B, surmounted by a coronet, the whole being suspended between the main and foremast of the yacht. The lamps used on this occasion were obtained specially for the illumination from Messrs. Woodhouse and Rawson at a very short notice, and consisted of 20 C.P. new filament 46-volt lamps. Electric current for the lamps was supplied by the Gramme dynamo worked in H.M. gunboat Bloodhound, which was moored off the stern of the royal yacht. In addition to the above effective device, a powerful naval search light of 25,000 C.P. was displayed at intervals, its pure beam of white light illuminating Osborne House, the grounds, and the various ships and yachts in the bay. The whole of the arrangements were carried out by the electric light staff of the naval torpedo school ship Vernon.

—— The Brush Electric Company, of Baltimore, are putting in a Ball automatic cut off engine in their Central Station to run their day circuit.

—— The electric light is a great insect exterminator this hot weather. In some places from a pint to a quart of dead moths and bugs can be picked up every morning under each globe.

—— Jos. T. McConnell, of Pittsburgh, Pa., superintendent McTighe Electric Light and Manufacturing Co., died suddenly, August 6th, A.M. He was well known in the West as superintendent of the Central District and Printing Telegraph Co., of Pittsburgh, until a year ago, when he went with the McTighe Co.

—— The Imperial Gas Association in Vienna have decided upon the establishment of a central electric lighting station, at which sufficient current will be generated to aliment 12,000 sixteen candle-power incandescent lamps. The installation at the central station will consist of four steam engines of 200 horse-power, four dynamos and 9,600 accumulators.

—— At McKeesport, Pa., the citizens are rejoicing over the fact that they will be furnished gas almost free of cost, owing to the rivalry between the gas company and the electric light company. The light company is badly frightening the gas concern. The latter offers gas almost free of charge before they will take out the meter and allow the other company a chance.

—— The Solar Carbon and Manufacturing Company, of Philadelphia, has been incorporated with a capital stock of $300,000 The company is organized for the purpose of manufacturing, purchasing, using and selling carbon in its various forms, including electric light carbons and manufacturing, using and selling any and all machinery needful for its purposes and all appliances connected therewith. The directors are James M. C. Creighton, B. K. Jamison, James B. Young, Joseph F. Tobias, M. E. M'Dowell and Harry L. Frank, of Philadelphia, and John W. Patterson, of Pittsburgh.

—— Some experiments took place at Woolwich Arsenal recently, with a view of testing the practicability of photographing the interior of guns by means of the electric light, so as to detect flaws during their manufacture, or cracks after firing. Two 8-inch muzzle-loading guns formed the subject of the test. The light was introduced a short distance within the muzzle, and reflected down the bore by means of a mirror, the photograph being taken from the breech end. The light produced by a dynamo was not quite so steady as that from a primary battery or accumulators, but both gave good results.

—— The electric light company at Fargo, does not want to build the electric light tower torn down by the storm the past week, as it will cost several thousand dollars, and they think there is more profit in placing numerous lights about the streets. But the citizens are much opposed to giving it up, as it lighted the city and country more or less for a radius of miles, and was a fine advertisement for the place. It is generally believed that it was a cyclone that demolished it, but fortunately did not come low enough to strike any building. It was the worst storm that has ever visited that locality.

—— The Newburgh Electric Lighting Company is the title of a new organization in Newburgh, N. Y. Mr. Edward W. Wilson is president, and Mr. Arthur V. Wiltsie secretary and treasurer. Its capital is $60,000, and the company has asked and been granted permission from the Common Council to erect poles and string its wires throughout the city. The light furnished is the Thomson-Houston system. The company propose to erect their works immediately, as soon as a desirable location can be secured for the plant. They will cover the whole city, and extend their wires as far as Balmville and West Newburgh. The directors are all prominent men and capitalists, and evidently mean business.

ELECTRIC LIGHT NEWS

—— The Star Iron Tower Company, of Ft. Wayne, Ind., has closed contracts at Peoria, Ill., for twelve towers, each 125 feet high.

—— In Algiers they are making use of the electric light for harvest operations at night. The climate is such that no European can work during the day.

—— The very satisfactory electric lighting at City Hall, New York, during the Grant obsequies, was done by the United States Electric Lighting Company.

—— The catalogue of A. L. Ide & Son, of Springfield, Ill., has been received at this office. These gentlemen are large manufacturers of engines, and have met with much success in furnishing power for electric light companies.

—— The work of installing the electric light in the offices of the President of Giunta and the various other offices of the municipality of Milan is being proceeded with. The contract, which is for five years, and which comes into operation on the 1st of September, has been obtained by the Societa Generale di Elettricita.

—— The Cowles Electric Smelting and Aluminium Company, of Cleveland, have doubled their output. The addition of two Brush dynamos has increased materially their capacity. In order to meet a rapidly-increasing business, they are making preparation for extensive improvements and extensions to their plant.

—— The Philadelphia Park Commission has determined that the Thomson-Houston Electric Light Company should have the privilege of locating nine lamps within the park at $1 a light each night. Six of the lamps are to be located on the river drive between Fairmount and Girard avenues, and the other three near the boathouses above the forebay. They will be put up prior to August 15, and will be kept burning until October 15.

—— Temporary electric lighting is in use at the best balls in London, as it avoids the heat which even wax candles make. The hue of electric light is cool, like concentrated starlight, and its intensity is averted by studding tents and drawing-rooms with innumerable tiny jets among the ferns and flowers. In small glass globes of different colors, those thousands of jeweled lights glancing among ferns and palms leave Aladdin's dream in the background.

—— Jos. Welsh, a carbon trimmer in the employ of the Brush Electric Light Co., Baltimore, was instantly killed at 10 30 o'clock Saturday night by contact with one of the electric wires. While adjusting a lamp at the corner of Madison and Buren streets, his right arm accidentally touched the wire which supplied the lamp. He fell to the pavement, and when picked up was dead. He was 28 years of age. His body was removed to his late residence at the northeast corner of Madison and Forrest streets.

—— "Ethel," said Æthelred, softly, as one who walketh delicately in the dark, enmouthing the tell-tale clove, "what is the difference between myself and the electric light?" "Say, thou, my dear lord Æthelred," she said, with maiden modesty. "Because," he made answer boldly, fanning his royal flushed face the while, "it is brilliant without heat, whilst I—you see?" "I tumble, good, my Æthelred," she murmured, inhaling the spice laden air, "but I wot another shade of difference betwixt you twain; the electric light does not go out between the acts." And a deep profound silence smote the balmy atmosphere like the stroke of a gong, while Æthelred, turning his head that he might breathe freely out into the aisle, had the comfort of knowing that the electric light was in a hopeless minority, any how.—*Burdette.*

ELECTRICAL PATENTS

INDEX OF INVENTIONS FOR WHICH LETTERS PATENT OF THE UNITED STATES WERE GRANTED IN THE WEEK ENDING AUG. 4, 1885.

323,435 Fire alarm telegraph box; Frank F. Loomis, Akron, Ohio.

323,459 Electric railway system; Frank J. Sprague, New York, assignor to the Sprague Electric Railway and Motor Company.

323,460 Electro-dynamic motor; Frank J. Sprague, New York, assignor to the Sprague Electric Railway and Motor Company.

323,470 Cut-out for dynamo-electric machines; Charles J. Van Depoele, Chicago, Ill.

323,500 Furnace for baking incandescents; Chas. Coultass, Sharpsburg, assignor to the Empire Electric Carbon Company, Pittsburgh, Pa.

323,504 Electric lamp insulator; John R. Fletcher, Dayton, Ohio., assignor of one-half to Joseph E. Loewes, same place.

323,514 Manufacture of methylene blue by electrolysis; Wilhelm Majert, Grunan, near Berlin, Germany, assignor of two-thirds to Dr. Adolph Ewer and Paul Pick, same place.

323,516 Multiplex electric arc lamp: Richard H. Mather, Windsor, Conn.

323,600 Electric low-water alarm for boilers; Wm. P. Ryman, Wilkesbarre, Pa.

323,625 Chandelier; Raymond F. Barnes, Brooklyn, N. Y.

323,650 Regulator for electric motors; Moses G Farmer, New York, N. Y.

323,651 Electro-magnetic heating apparatus; Moses G. Farmer, New York, N. Y.

323,652 Electro-magnetic motor; Moses G. Farmer, New York, N. Y.

323,653 Electric motor; Moses G. Farmer, New York, N. Y.

323,663 Armature for electro-magnets; James F. Gilliland, Indianapolis, Ind.

323,675 Electric grip for railways; John C. Henderson, New York, N. Y.

323,822 Lightning arrester for line wires; George W. Mingle, Philadelphia, Pa., assignor of two thirds to E. Ward Wilkins and Wm. T. Brown, both of same place.

323,890 Secondary or storage battery; Eli T. Starr and E. Eugene Starr, Philadelphia, Pa., assignors to the Starr Electric Storage Company, Camden, N. J.

A printed copy of the specification and drawing of any patent to the annexed list, also of any patent issued since 1865, will be furnished by any of the patent solicitors whose advertisements appear in this journal. In ordering please state the number and date of the patent desired.

If an invention has not been patented in the United States for more than one year, it may still be patented in Canada. Cost for Canadian patent, $40.00. Various other Foreign patents may also be obtained.

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